



Arbovirus Surveillance and Mosquito Control in Idaho



Guidance for Counties
2nd Edition

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Purpose of the Plan:

The West Nile virus (WNV) model surveillance and response plan provides a framework that state and local government agencies can use to ensure a coordinated approach to protecting people and animals from WNV in a responsible and thoughtful way.

Goals of this document:

- Describe West Nile virus
- Provide educational tools to heighten community awareness about WNV
- Explain prevention options for people and for horses
- Explain surveillance activities in Idaho
- Provide information on standard mosquito abatement operations
- Provide a phased-response model to mosquito control when WNV is suspected or found in a community
- Provide guidance for abatement district formation
- Provide limited guidance for mosquito control in areas lacking formal mosquito abatement districts
- Provide a list of agency contacts/resources

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SECTION 1

The Basics

- A.** An introduction to West Nile virus (WNV)
- B.** WNV in humans
- C.** WNV in horses
- D.** WNV in dogs, cats, and other animals
- E.** WNV in birds
- F.** WNV and mosquitoes
- G.** Surveillance activities in Idaho

A. An Introduction to West Nile Virus

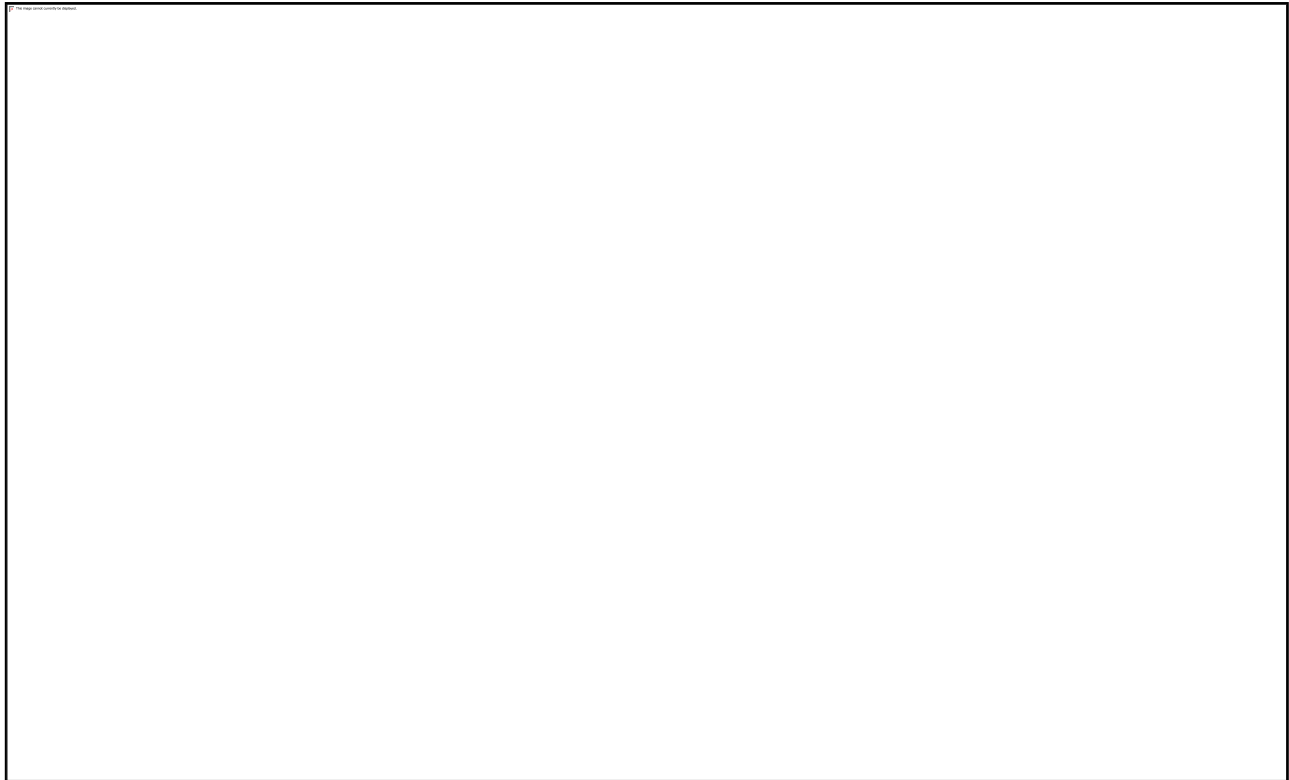
History

West Nile virus (WNV) was first isolated from an ill adult woman in the West Nile District of Uganda in 1937. The outbreak potential of this virus was not recognized until a large number of meningitis and encephalitis (inflammation of the spinal cord and brain) cases occurred in Israel in 1957. Equine disease was first noted in Egypt and France in the early 1960s. The first appearance of WNV in North America in 1999, with encephalitis reported in humans and horses, and the subsequent spread across the United States is an important milestone in the evolving history of this virus.

Geographic Distribution

WNV has been previously described in Africa, Europe, the Middle East, west and central Asia and most recently North America. In 1999 WNV entered the United States in the greater New York City area (Figure 1). Since then, the virus has moved westward each year.

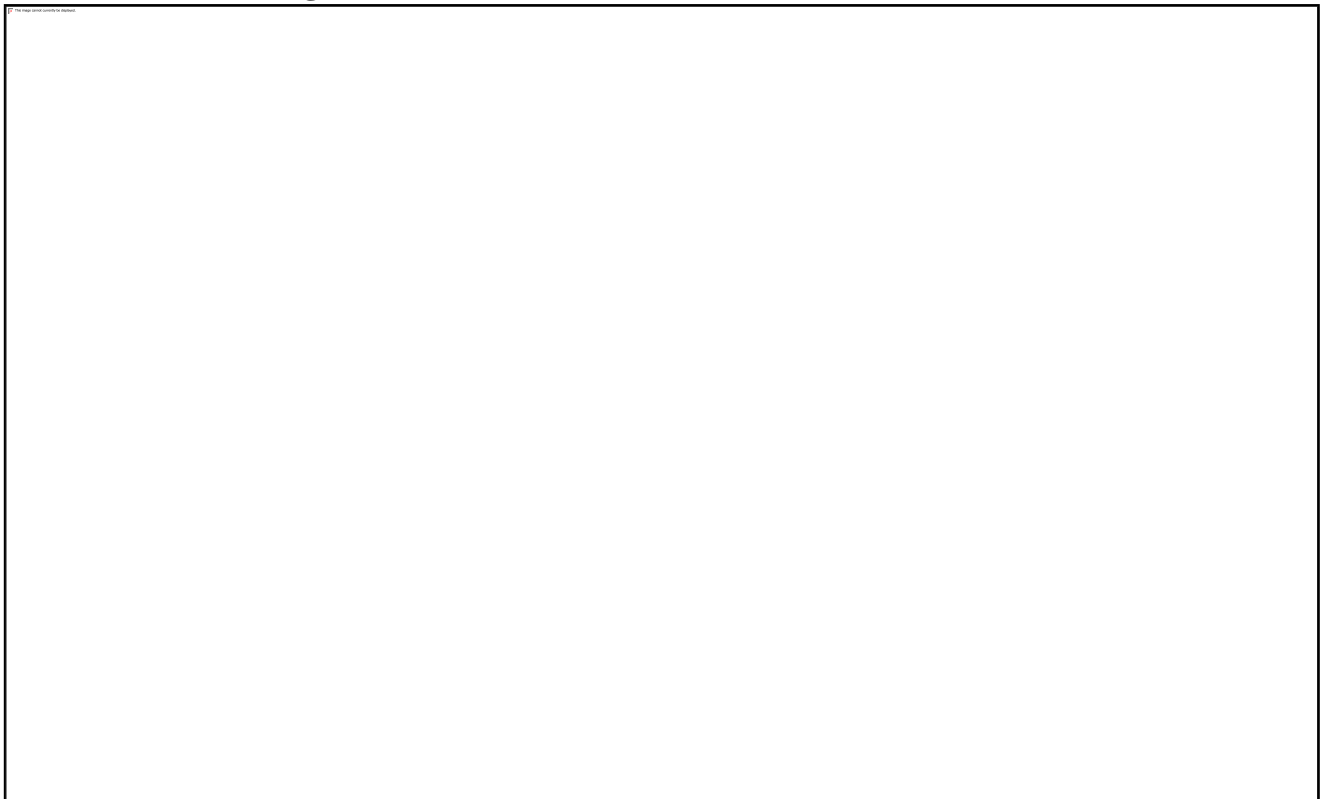
Figure 1: West Nile virus distribution–U.S., 1999



In 2003, a shipment of alligators was imported into south-central Idaho from a WNV-positive area of Florida. Soon after arrival they became ill and many died. Little was known about alligators and WNV at that time. After an investigation, it was determined that they had become infected with WNV prior to arrival in Idaho. A mild human infection was associated with the alligators, most-likely derived from virus-laden alligator blood entering an unprotected skin wound. Mosquito surveillance in the immediate vicinity of the alligator farm, however, failed to demonstrate any direct introduction of the virus into the local ecosystem from the alligators. It wasn't until 2004 that mosquito-borne transmission of WNV was established in Idaho, most likely introduced by the migration into Idaho of an infected bird which is thought to be the primary method of virus introduction into a new area.

The final 2006 nationwide case count (symptomatic infections only) and geographic distribution for the U.S. are shown in Figure 2, provided by the Centers for Disease Control and Prevention (CDC). Note that although Idaho had high case numbers compared to other states, this pattern may not hold true in future years.

Figure 2: West Nile virus distribution– U.S., 2006



Idaho counties with evidence of local WNV transmission in 2006 are shown in Figure 3.

Figure 3: Counties with evidence of local West Nile virus transmission – Idaho, 2006

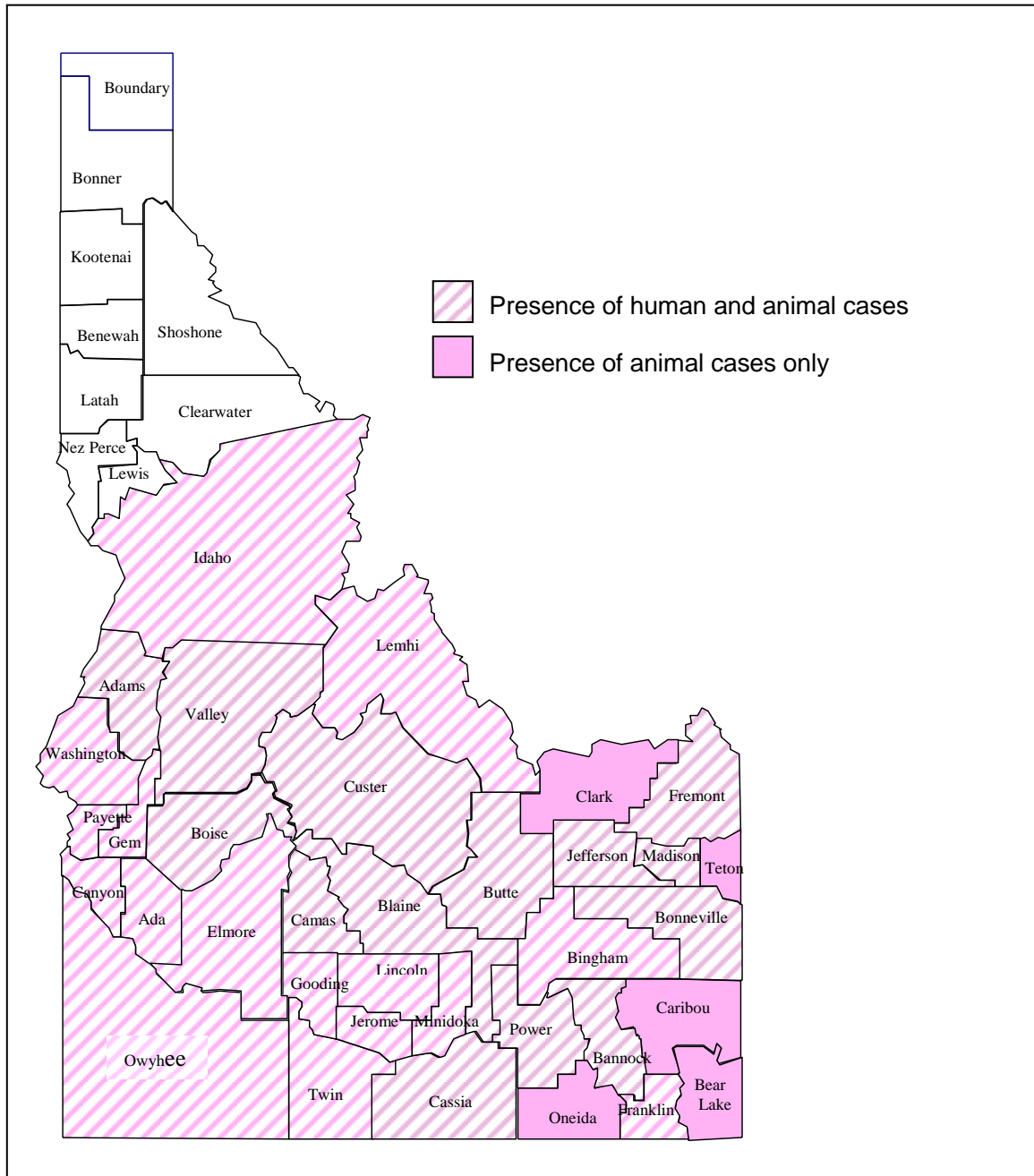


Table 1: WNV Surveillance Findings – Idaho, 2004-2006

Year	Humans*	Birds	Horses	Mosquito pools*
2004	3	7	22	0
2005	13	15	113	17
2006	1016[†]	127	338	238

* 2003 alligator-associated human case not shown in chart

[†]996 cases + 20 asymptomatic blood donors

B. WNV in Humans

Human case-reports have increased significantly in Idaho since the virus was first introduced into the ecosystem in 2004 (Table 1).

West Nile virus can cause a range of symptoms from asymptomatic to fatal. According to the CDC, 80% of infections are thought to be asymptomatic.

With regard to symptomatic cases, the incubation period in humans (*i.e.*, time from infection to onset of disease symptoms) can be from 3-14 days after the bite of an infected mosquito.

It is estimated that 20% of the people who become infected will develop West Nile fever, a condition that may include the following: fever, headache, body aches, and swollen lymph glands. A skin rash on the trunk of the body has been reported on rare occasions. Symptoms may last from days to weeks.

Less than 1% of infected persons exhibit more severe complications of infection, such as WN encephalitis or meningitis. Symptoms may include one or more of the following: headache, high fever, neck stiffness, stupor, disorientation, coma, tremors, convulsions, muscle weakness, and paralysis. These patients typically require hospitalization. Symptoms of severe disease may last weeks to months, although neurological deficits may be permanent. It is estimated that 1 in 150 persons infected with WNV will develop this form of disease. Death, although uncommon, is also possible. Acute flaccid paralysis (AFP), a polio-like illness affecting nerves, has also been described.

C. WNV in Horses

Although horses are susceptible to WNV infection, they are considered dead-end hosts, meaning they do not transmit the infection to other horses or humans. Approximately 30% of infected horses may die from a WNV infection.

Infected horses may display one or more of the following signs:

- lack of coordination and stumbling
- depression, disorientation, or apprehension
- weakness of the hind limbs, falling down, or an inability to rise
- muscle twitching
- grinding teeth
- excessive sweating and colicky appearance
- fever (detected in less than one-quarter of all confirmed cases)
- hypersensitivity
- blindness
- convulsions
- paralysis
- death

Horses exhibiting any of the signs listed above may be tested for WNV by their veterinarian. There are several effective vaccines available for horses available through licensed veterinarians and some feed and tack stores. Annual boosters are required to maintain immunity.

D. WNV in Dogs, Cats and other animals

The tables below list mammals and reptiles documented with WNV in the United States to date. These lists are taken from the USGS National Wildlife Health Center web site at: http://www.nwhc.usgs.gov/disease_information/west_nile_virus/

Table 2: Mammal species documented with WNV infection

Domestic Cattle	Black Bear	Black-tailed Prairie Dogs
Mountain Goat	Big Brown Bat	Red Panda
Domestic (Suffolk) Sheep	Little Brown Bat	Gray Squirrel
Llama	Northern Long-eared Bat	Fox Squirrel
Alpaca	Domestic Rabbit	Eastern Chipmunk
Mule Deer	Mule	Harbor Seal
White-tailed Deer	Donkey	Indian (Asian) Elephant
Reindeer	Domestic Horse	Striped skunk
Babirusa	Great Indian Rhinoceros	Ring-tailed lemur
Domestic Dog	Rhesus Macaque	
Timber Wolf ^c	Pigtail Macaque	
Domestic Cat	Barbary Macaque	
Snow Leopard	Olive Baboon	

Dogs and cats are not generally thought to become ill from WNV although some rare exceptions have been documented, including one in Idaho. They are not believed to be carriers of the virus and no vaccines are available for dogs or cats.

Table 3. Reptile species documented with WNV infection

American Alligator
Crocodile Monitor

E. WNV in Birds

Source: US Geological Survey, National Wildlife Health Center

Numerous bird species are susceptible to WNV infection. Members of the *Corvidae* family (*e.g.*, crows, ravens, magpies, jays), and raptors (*e.g.*, owls, red-tail hawks, and other birds of prey) seem particularly susceptible and develop severe disease or die from WNV.

- A complete list of 333 WNV-affected bird species may be found at the U.S. Geological Survey, National Wildlife Health Center web site:
http://www.nwhc.usgs.gov/disease_information/west_nile_virus/AffectedSpeciesList2005.doc
- Native and exotic/captive North American species is shown in the table below.
- The black-billed magpie, the American Crow, and the Sage Grouse were the three most affected birds in Idaho in 2006.

Table 4. Native and exotic / captive North American bird species susceptible to WNV infection

Bird Species Common Name	Native, Exotic/Captive
Abyssinian Ground-Hornbill	Exotic-Captive
Acorn Woodpecker	Native
African Grey Parrot	Exotic-Captive
African Penguin	Exotic-Captive
American Coot	Native
American Crow	Native
American Dipper	Native
American Goldfinch	Native
American Kestrel	Native
American Robin	Native
American White Pelican	Native
Anna's Hummingbird	Native
Bald Eagle	Native
Baltimore Oriole	Native
Band-tailed Pigeon	Native
Bank Swallow	Native

Bird Species Common Name	Native, Exotic/Captive
Barn Owl	Native
Barn Swallow	Native
Barred Owl	Native
Belted Kingfisher	Native
Black Phoebe	Native
Black Skimmer	Native
Black Vulture	Native
Black-billed Magpie	Native
Black-capped Chickadee	Native
Black-capped Lory	Exotic-Captive
Black-chinned Sparrow	Native
Black-crowned Night Heron	Native
Black-headed Grosbeak	Native
Blackpoll Warbler	Native
Black-throated Blue Warbler	Native
Black-throated Gray Warbler	Native
Black-whiskered Vireo	Native
Blue Jay	Native
Blue-crowned Conure	Exotic-Captive
Blue-eared Pheasant	Exotic-Captive
Blue-streaked Lory	Exotic-Captive
Blythe's Tragopan	Exotic-Captive
Boat-tailed Grackle	Native
Bobolink	Native
Boreal Owl	Native
Brewer's Blackbird	Native
Broad-winged Hawk	Native
Bronze-winged Duck	Native
Brown Thrasher	Native
Brown-headed Cowbird	Native
Budgerigar	Exotic-Captive
Bufflehead	Native
Bullock's Oriole	Native
Burrowing Owl	Native
Bushtit	Native
Cactus Wren	Native
California Condor	Native
California Gull	Native
California Quail	Native
California Towhee	Native

Bird Species Common Name	Native, Exotic/Captive
Canada Goose	Native
Canada Warbler	Native
Canary-winged Parakeet	Exotic-Captive
Canvasback	Native
Carolina Chickadee	Native
Carolina Wren	Native
Caspian Tern	Native
Cassin's Finch	Native
Cattle Egret	Native
Cedar Waxwing	Native
Chestnut-backed Chickadee	Native
Chihuahuan Raven	Native
Chilean Flamingo	Exotic-Captive
Chimney Swift	Native
Chinese Goose	Exotic-Captive
Chipping Sparrow	Native
Chukar	Introduced
Cinereus Vulture	Exotic-Captive
Cinnamon Teal	Native
Clapper Rail	Native
Clark's Grebe	Native
Clark's Nutcracker	Native
Cliff Swallow	Native
Cockatiel	Exotic-Captive
Cockatoo	Exotic-Captive
Common Black Hawk	Native
Common Canary	Exotic-Captive
Common Goldeneye	Native
Common Grackle	Native
Common Ground-Dove	Native
Common Loon	Native
Common Merganser	Native
Common Moorhen	Native
Common Nighthawk	Native
Common Peafowl	Exotic-Captive
Common Raven	Native
Common Yellowthroat	Native
Cooper's Hawk	Native
Crimson Rosella	Exotic-Captive
Dark-eyed Junco	Native

Bird Species Common Name	Native, Exotic/Captive
Dickcissel	Native
Domestic Chicken	Exotic-Captive
Double-crested Cormorant	Native
Downy Woodpecker	Native
Dusky Lory	Exotic-Captive
Eastern Bluebird	Native
Eastern Kingbird	Native
Eastern Phoebe	Native
Eastern Screech-Owl	Native
Eastern Towhee	Native
Elegant Crested Tinamou	Exotic-Captive
Elf Owl	Native
Emperor Goose	Exotic-Captive
Emu	Exotic-Captive
Eurasian Collared-Dove	Introduced
Eurasian Jay	Exotic-Captive
Eurasian Wigeon	Native
European Goldfinch	Exotic-Captive
European Starling	Introduced
Evening Grosbeak	Native
Ferruginous Hawk	Native
Field Sparrow	Native
Fish Crow	Native
Flammulated Owl	Native
Fox Sparrow	Native
Gila Woodpecker	Native
Glaucous-winged Gull	Native
Golden Eagle	Native
Golden-crowned Sparrow	Native
Gouldian Finch	Exotic-Captive
Gray Catbird	Native
Gray-cheeked Thrush	Native
Great Black-backed Gull	Native
Great Blue Heron	Native
Great Crested Flycatcher	Native
Great Egret	Native
Great Gray Owl	Native
Great Horned Owl	Native
Greater Flamingo	Exotic-Captive
Greater Prairie-Chicken	Native

Bird Species Common Name	Native, Exotic/Captive
Greater Roadrunner	Native
Greater Sage-Grouse	Native
Greater Scaup	Native
Greater White-fronted Goose	Native
Great-tailed Grackle	Native
Green Heron	Native
Green-winged Teal	Native
Guanay Cormorant	Exotic-Captive
Gyr Falcon	Native-Captive
Hairy Woodpecker	Native
Hammond's Flycatcher	Native
Harris' Hawk	Native
Hawaiian Goose (Nene)	Exotic-Captive
Hermit Thrush	Native
Herring Gull	Native
Hooded Crow	Native
Hooded Merganser	Native
Hooded Oriole	Native
Hooded Warbler	Native
House Finch	Native
House Sparrow	Introduced
House Wren	Native
Humboldt Penguin	Exotic-Captive
Impeyan Pheasant	Exotic-Captive
Inca Dove	Native
Inca Tern	Exotic-Captive
Kentucky Warbler	Native
Killdeer	Native
Lark Sparrow	Native
Laughing Gull	Native
Least Bittern	Native
Least Tern	Native
Lesser Goldfinch	Native
Lesser Nighthawk	Native
Lesser Scaup	Native
Lewis' Woodpecker	Native
Limpkin	Native
Lincoln's Sparrow	Native
Loggerhead Shrike	Native
Long-eared Owl	Native

Bird Species Common Name	Native, Exotic/Captive
Macaw	Exotic-Captive
Mallard	Native
Merlin	Native
Mexican Jay	Native
Micronesian Kingfisher	Exotic-Captive
Mississippi Kite	Native
Monal Pheasant	Exotic-Captive
Mottled Duck	Native
Mountain Bluebird	Native
Mountain Chickadee	Native
Mountain Quail	Native
Mourning Dove	Native
Muscovy Duck	Exotic-Captive
Mute Swan	Introduced
Nashville Warbler	Native
Northern Bobwhite	Native
Northern Cardinal	Native
Northern Flicker	Native
Northern Goshawk	Native
Northern Harrier	Native
Northern Hawk-Owl	Native
Northern Mockingbird	Native
Northern Parula	Native
Northern Saw-whet Owl	Native
Northern Waterthrush	Native
Nutmeg Mannikin	Exotic-Captive
Nuttall's Woodpecker	Native
Oak Titmouse	Native
Olive-sided Flycatcher	Native
Orange-crowned Warbler	Native
Orchard Oriole	Native
Osprey	Native
Ovenbird	Native
Pacific Parrotlet	Exotic-Captive
Pacific-slope Flycatcher	Native
Pale-headed Rosella	Exotic-Captive
Palm Tanager	Exotic-Captive
Pelagic Cormorant	Native
Peregrine Falcon	Native
Pied-billed Grebe	Native

Bird Species Common Name	Native, Exotic/Captive
Pine Siskin	Native
Pinyon Jay	Native
Piping Plover	Native
Prairie Falcon	Native
Puna Teal	Exotic-Captive
Purple Finch	Native
Purple Gallinule	Native
Purple Martin	Native
Pygmy Nuthatch	Native
Rainbow Lorikeet	Exotic-Captive
Red Crossbill	Native
Red Lory	Exotic-Captive
Red-bellied Woodpecker	Native
Red-breasted Goose	Exotic-Captive
Red-breasted Nuthatch	Native
Red-breasted Sapsucker	Native
Red-crowned Parrot	Exotic-Captive
Red-eyed Vireo	Native
Red-headed Woodpecker	Native
Red-shouldered Hawk	Native
Red-tailed Hawk	Native
Red-winged Blackbird	Native
Ring-billed Gull	Native
Ringed Turtle-Dove	Introduced
Ring-necked Pheasant	Introduced
Rock Pigeon	Introduced
Rose-breasted Grosbeak	Native
Rough-legged Hawk	Native
Ruby-throated Hummingbird	Native
Ruddy Duck	Native
Ruddy Turnstone	Native
Ruffed Grouse	Native
Rufous Hummingbird	Native
Rusty Blackbird	Native
Sandhill Crane	Native
Satyr Tragopan	Exotic-Captive
Savannah Sparrow	Native
Scarlet Ibis	Exotic-Captive
Scarlet Tanager	Native
Scissor-tailed Flycatcher	Native

Bird Species Common Name	Native, Exotic/Captive
Sharp-shinned Hawk	Native
Short-eared Owl	Native
Smew	Exotic-Captive
Snowy Egret	Native
Snowy Owl	Native
Society Finch	Exotic-Captive
Song Sparrow	Native
Sora	Native
Spotted Owl	Native-Captive
Spotted Towhee	Native
Steller's Jay	Native
Swainson's Hawk	Native
Swainson's Thrush	Native
Swallow-tailed Kite	Native
Swamp Sparrow	Native
Tawny Owl	Exotic-Captive
Tennessee Warbler	Native
Thayer's Gull	Native
Thick-billed Parrot	Exotic-Captive
Townsend's Warbler	Native
Tree Swallow	Native
Tufted Titmouse	Native
Tundra Swan	Native
Turkey Vulture	Native
Varied Thrush	Native
Varied Tit	Exotic-Captive
Veery	Native
Violet-necked Lorikeet	Exotic-Captive
Virginia Rail	Native
Warbling Vireo	Native
Wedge-tail Eagle	Exotic-Captive
Western Bluebird	Native
Western Kingbird	Native
Western Meadowlark	Native
Western Sandpiper	Native
Western Screech-Owl	Native
Western Scrub-Jay	Native
Western Tanager	Native
Whip-poor-will	Native
White-breasted Nuthatch	Native

Bird Species Common Name	Native, Exotic/Captive
White-crowned Pigeon	Native
White-crowned Sparrow	Native
White-faced Ibis	Native
White-tailed Kite	Native
White-winged Dove	Native
Wild Turkey	Native
Willow Flycatcher	Native
Wilson's Warbler	Native
Winter Wren	Native
Wood Duck	Native
Wood Thrush	Native
Yellow Warbler	Native
Yellow-bellied Sapsucker	Native
Yellow-billed Cuckoo	Native
Yellow-billed Duck	Exotic-Captive
Yellow-billed Magpie	Native
Yellow-crowned Night-Heron	Native
Yellow-rumped Warbler	Native
Yellow-throated Warbler	Native
Zebra Finch	Exotic-Captive
Zenaida Dove	Exotic-Captive

F. WNV and Mosquitoes

There are 62 known mosquito species found to produce West Nile virus. Not all mosquitoes bite humans. The *Culex* species are considered one of the most important vector species for human illness.

Table 5. Mosquito species producing WNV

<i>Aedes aegypti</i>	<i>Anopheles hermsi</i>
<i>Aedes albopictus</i>	<i>Anopheles punctipennis</i>
<i>Aedes atlanticus/tormentor</i>	<i>Anopheles quadrimaculatus</i>
<i>Aedes atropalpus</i>	<i>Anopheles walkeri</i>
<i>Aedes canadensis</i>	<i>Coquillettidia perturbans</i>
<i>Aedes cantator</i>	<i>Culex apicalis</i>
<i>Aedes cinereus</i>	<i>Culex coronator</i>
<i>Aedes condolezens*</i>	<i>Culex erraticus</i>
<i>Aedes dorsalis</i>	<i>Culex erythrothorax</i>
<i>Aedes dupreei</i>	<i>Culex nigripalpus</i>
<i>Aedes fitchii</i>	<i>Culex pipiens</i>
<i>Aedes fulvus pallens</i>	<i>Culex quinquefasciatus</i>
<i>Aedes grossbecki</i>	<i>Culex restuans</i>
<i>Aedes infirmatus</i>	<i>Culex salinarius</i>
<i>Aedes japonicus</i>	<i>Culex stigmatosoma</i>
<i>Aedes melanimon</i>	<i>Culex tarsalis</i>
<i>Aedes nigromaculis</i>	<i>Culex territans</i>
<i>Aedes provocans</i>	<i>Culex thriambus</i>
<i>Aedes sollicitans</i>	<i>Culiseta incidens</i>
<i>Aedes squamiger</i>	<i>Culiseta impatiens</i>
<i>Aedes sticticus</i>	<i>Culiseta inornata</i>
<i>Aedes stimulans</i>	<i>Culiseta melanura</i>
<i>Aedes taeniorhynchus</i>	<i>Culiseta morsitans</i>
<i>Aedes triseriatus</i>	<i>Deinocerites cancer</i>
<i>Aedes trivittatus</i>	<i>Mansonia titillans</i>
<i>Aedes vexans</i>	<i>Orthopodomyia signifera</i>
<i>Anopheles atropos</i>	<i>Psorophora ciliata</i>
<i>Anopheles barberi</i>	<i>Psorophora columbiae</i>
<i>Anopheles crucians/bradleyi</i>	<i>Psorophora ferox</i>
<i>Anopheles franciscanus</i>	<i>Psorophora howardii</i>
<i>Anopheles freeborni</i>	<i>Uranotaenia sapphirina</i>

Source: Centers for Disease Control and Prevention,
<http://www.cdc.gov/ncidod/dvbid/westnile/mosquitoSpecies.htm>

G. Surveillance Activities in Idaho

WNV surveillance entails the collection of data from different sources to determine if the virus might be present in a community and to document transmission to susceptible species. Because WNV affects many different species, surveillance activities are critical and carried out by several agencies and professionals as listed below. Surveillance findings are reported to the public in a timely manner through a summary data table located on the Idaho Department of Health and Welfare (IDHW) web site at www.westnile.idaho.gov . Press releases are often produced regarding WNV to ensure individuals are made aware of the presence of the virus in their community to enable them to take personal precautions and avoid mosquito bites.

I. Human surveillance:

- Health Districts
- Idaho Department of Health and Welfare, Office of Epidemiology and Food Protection (OEFP) and Idaho Bureau of Laboratories (IBL)
- Health care providers and clinical laboratories

II. Horse surveillance

- Idaho State Department of Agriculture
- U.S. Department of Agriculture
- Veterinarians, private sector

III. Dead bird surveillance

- Idaho Department of Fish and Game

IV. Mosquito surveillance

- Participating mosquito abatement districts
- Participating Health Districts
- Participating counties

I. Human Surveillance

Commercial laboratories provide WNV tests to health care providers upon request. The IBL will typically provide laboratory testing for hospitalized individuals only.

West Nile virus infections in people are reportable in Idaho. Health care providers and laboratorians are required to report any person with this infection to the IDHW, Office of Epidemiology and Food Protection (OEFPP) or their local public health district. All case-reports are ultimately held in repository by OEFPP in a secure database. Idaho-specific data, without names or other identifying information, is then shared with the CDC as part of nationwide surveillance efforts.

OEFPP posts a table of WNV surveillance data on the IDHW West Nile virus web site: www.westnile.idaho.gov in a timely manner, showing reported cases by county.

II. Horse Surveillance

The Idaho State Department of Agriculture (ISDA) encourages veterinarians to test any horse with a neurologic illness for WNV. ISDA does offer equine testing. Horses may also be tested at other veterinary diagnostic laboratories including the Washington Animal Disease Diagnostic Laboratory (WADDL).

ISDA has equine testing information for veterinarians on their website at <http://www.agri.state.id.us/Categories/Animals/animalHealth/healthdisease.php#WNV>

ISDA provides a report of all equine findings to OEFPP that is included with the information contained in the WNV county surveillance table on the IDHW website. Additionally, OEFPP informs the health district of jurisdiction where the positive horse resides.

III. Dead Bird Surveillance

Reports of dead birds and testing of a sample of those birds provides information on the presence or absence of WNV in a community. As is common with other mosquito-borne viruses, WNV is maintained in a bird-mosquito cycle and transmitted to mammals including humans and horses via bites from infected mosquitoes. Members of the family *Corvidae* (e.g., crows, ravens, jays, and magpies) and raptors (e.g., owls, red-tail hawks, and other birds of prey) appear to be the most sensitive species and experience significant mortality rates. Sage grouse have also been impacted in Idaho. The high mortality rate and the ease of identifying these large, conspicuous birds makes them a good indicator (sentinel) of disease in a community.

Appropriate bird species for WNV testing are the corvids and raptors. Testing of sage grouse also occurs in conjunction with the Idaho Department of Fish and Game. Concerned Idaho citizens are encouraged to contact their local fish and game office to

report dead birds. Should the dead birds be corvids or raptors, samples may be collected by the regional Fish and Game office for testing. The Idaho State Department of Health and Welfare, Bureau of Laboratories collaborates with IDFG by providing testing of the submitted birds.

Testing of birds occurs early in the WNV season to indicate the virus is present in a particular area. Fish and Game will STOP testing birds in a community when it is evident the virus is present. There is no need to test every dead bird.

As with any dead animals, gloves should be worn and no carcass should ever be touched with bare hands. Specimens should be double-bagged in plastic as soon as possible and stored in a cool place.

OEFP reports lab test findings back to IDFG, the affected health districts, and includes findings in the WNV surveillance table found at www.westnile.idaho.gov.

IV. Mosquito Surveillance:

Some mosquitoes are more likely to carry WNV than others, some are just pests. In Idaho, *Culex tarsalis* and *Culex pipiens* are considered the most common WNV-carrying mosquitoes. Participating mosquito abatement districts and other entities (some health districts, some counties) collect a sample of mosquitoes to determine the species of mosquito present. The presence of an abundance of vector mosquitoes (*e.g.*, *Culex tarsalis* and *Culex pipiens*) suggests the risk for infection is present. In addition, early testing of a sample of these vector-mosquitoes for WNV, either locally through in-house testing by abatement districts, or by the Idaho Bureau of Laboratories (IBL), provides further information on the presence of the virus in a locale (along with other surveillance indicators *e.g.* birds, horses, people) and may guide abatement efforts. (See the section on Standard Operating Procedures for Mosquito Abatement Districts for the rationale behind mosquito surveillance).

Findings from the IBL will be shared in a timely manner with the submitting agency and the appropriate health district, and positive findings will also be included in the surveillance table found at www.westnile.idaho.gov.



SECTION 2

Communication and Public Awareness Activities

- A.** Frequently asked questions about West Nile virus
- B.** Prevention
- C.** Web sites and communication strategies

A. Frequently Asked Questions About West Nile Virus

Q. What is West Nile virus (WNV) and where did it come from?

- A.** West Nile virus is commonly found in parts of Europe, Asia, the Middle East, and Africa. WNV had not been found in the Western hemisphere prior to 1999. In the fall of that year, the virus was discovered in the greater New York City area. Although it is unclear how the virus was introduced into the United States, it appears to be here to stay. 2004 was the first year WNV transmission occurred locally in Idaho.



Q. What are the symptoms and treatment of WNV?

- A.** Although anyone encountering an infected mosquito has a chance of being infected, most infections do not lead to illness. In other words, the infection is asymptomatic 80% of the time. Usually, symptoms occur 3 to 14 days after a bite from an infected mosquito. If an illness does arise, the most common form is West Nile fever. West Nile fever may include a fever and/or headache, body aches, and sometimes a rash. Although symptoms may last from days to months, complete recovery is typical.

Serious illness can occur, typically in those over the age of 50 years, although it has been documented in all age groups. Often persons with more severe WNV disease have additional medical conditions such as cancer, heart disease, lung disease or weakened immune systems. More severe infections are marked by a rapid onset of high fever, including head and body aches, disorientation, tremors, convulsions and in the most severe cases, paralysis or death. These severe symptoms are due to encephalitis, an inflammation of the brain; meningitis, an inflammation of the tissues surrounding the brain; or meningoencephalitis, a combination of the two. Another rare manifestation of infection is acute flaccid paralysis (AFP), a polio-like syndrome. Serious neurologic infections may lead to permanent disability in some individuals.

There is no specific treatment for infection, but hospitalization and supportive care may improve the chances for recovery. There is no vaccine available for humans.

Q. How is the virus transmitted?

- A.** WNV is maintained in nature in a silent transmission cycle between certain mosquito species and certain bird species. Some infected migratory birds, while appearing healthy, can carry the virus into a new area. These infected birds are then bitten by local mosquitoes which, in turn, may transmit the virus to other birds, animals or people. The primary way for a person to become infected with WNV is by the bite of an infected mosquito. There is no evidence that direct person to person or animal to person transmission occurs under normal conditions. Bird to bird transmission has been demonstrated under laboratory conditions. Horses and humans are thought to be incapable of transmitting the virus further either through a biting mosquito or through direct contact.

Some rare human infections occurred through unusual routes; several were attributed to receiving contaminated blood or blood products during transfusion or tissue transplantation, one infant became infected after nursing from the infected mother, and one infection occurred in a fetus prior to birth.

Q. Do all mosquitoes transmit WNV?

- A.** No. Many mosquito species do not transmit WNV. However, several species of mosquitoes known to transmit the virus are found in Idaho. These include *Culex tarsalis*, *Culex pipiens* and *Aedes vexans*.

Several other mosquito-borne viruses capable of causing illness in people and animals are also found in western United States. They include Western equine encephalomyelitis virus (WEE) and St. Louis encephalitis virus (SLE). Illness from these viruses is very rare.

Q. How can I protect my family, my animals and myself from WNV?

- A.** Since mosquitoes are the typical source of infection, a simple way to reduce the risk of infection is to reduce the mosquito population around your home, barn, or other nearby structures and to practice some simple precautions to reduce the chance of being bitten by a mosquito. Refer to the next section on prevention options for humans and horses for a detailed list of activities you may consider to protect yourself and your animals from infection.

Q. What animals can be infected with the WNV?

- A. Certain animal species are more prone to illness than others.**

Birds

The crow and the magpie, so far, have been the most visibly affected bird populations in Idaho and the U.S. These birds may show signs of illness in a community days to weeks before any human cases have occurred. Because of this, reports of their death (and deaths of other highly susceptible bird- specifically ravens, jays, and raptors) may be good indicators that the virus has moved into a community. These birds tend to die singly or in small groups; they typically do not die in large flocks from WNV.

Horses

Horses can become seriously ill if infected. Horses vaccinated against eastern equine encephalitis (EEE), western equine encephalitis (WEE) and Venezuelan equine encephalitis (VEE) are not protected against WNV. Several equine vaccines against WNV are readily available. Contact your equine veterinarian for more information about vaccinating your horse against WNV. There is no evidence that WNV can be transmitted from horse-to-horse.

Q. Are gardeners, outdoor enthusiasts or hunters at higher risk?

- A.** Outdoor activities may put people at higher risk of WNV infection due to an increased chance of mosquito bites. Avoid mosquito bites by employing a few simple measures:
- **Wear repellent according to the label.** DEET, Picaridin and Oil of Lemon Eucalyptus are all EPA-approved repellents.

- **Cover up skin when outdoors between dusk and dawn, when mosquitoes are most active.**
- **Reduce standing water around your home or garden to reduce mosquito breeding sites.**

Window screens on campers and boats should be kept "bug-tight" as should netting on tents and similar outdoor gear. Keeping a campsite neat and orderly and eliminating any potential mosquito developing areas near long-term sites, when feasible, is always recommended. Electric "bug zappers" and mosquito magnet-type devices may not help, since these devices attract more mosquitoes to an area.

For hunters: proper cooking kills WNV, so there is no danger from eating properly cooked wild game. The CDC recommends that when handling any dead animal, it is a good idea to wear gloves to prevent blood exposure to bare hands.

B. Prevention

Human Protection Options

What you can do to protect yourself against mosquito bites

Reducing the mosquito population:

Mosquitoes lay their eggs in moist areas, and on calm standing water. The eggs produce larva that develop into pupa and remain in the water until the adults emerge from the pupa and fly off. Weeds, tall grass and shrubbery provide an outdoor home for adult mosquitoes. They also can enter houses through unscreened windows or doors or broken screens. Many mosquitoes will develop in any container that holds water, such as buckets, bird baths or discarded tires.

- Get rid of standing water weekly. Drain or empty buckets, plastic containers, ceramic pots, trash cans, bird baths, horse troughs, unused swimming pools, and other containers that can serve as mosquito development sites, also unclog rain and storm gutters that may hold moisture.
- Locate discarded tires, a common place for mosquitoes to breed, and remove them or empty any accumulated water. If the tires cannot be removed (such as in playground equipment), bore holes in the low points of the tire to allow water to drain out of the tire.
- Turn over plastic wading pools and wheelbarrows when not in use
- Keep swimming pools properly chlorinated and remove standing water from pool covers.
- Drill holes in the bottom of containers that are left outdoors, so that water can drain.
- Wear long-sleeved shirts, pants, and other clothing if you are exposed to mosquitoes, particularly between dusk and dawn when they are most active.
- Use repellents that contain DEET (N-N-diethyl-meta-toluamide), Picaridin, or Oil of Lemon Eucalyptus (all EPA-approved repellents). ALWAYS FOLLOW DIRECTIONS ON THE LABEL. Talk to your healthcare provider about use in small children. There are safety restrictions in the very young. Mosquito netting can be used to cover baby carriages.
- Repair holes in window screens and adjust screen doors to be tight-fitting and self-closing.
- Be aware that spraying lawns with pesticides is relatively ineffective. Reducing tall vegetation (such as tall grass and weeds), around the residence will remove day time adult mosquito harborage areas.
- If you can't drain water, then cover containers with fine netting to exclude mosquitoes, or, if larvae are present, apply mosquito larvicide's to standing water. Larvae look like tiny worms swimming near the water surface.

What to do if your area is getting sprayed with pesticide:



To avoid direct exposure to pesticides and reduce the risk of any reactions to pesticides observe the following recommendations:

- Some individuals are sensitive to pesticides. Persons with asthma or other respiratory conditions are encouraged to stay inside during spraying since there is a possibility that spraying could worsen those conditions. Small children can be exposed to more pesticide per body weight than adults and are also more sensitive to some types of pesticides. Whenever possible, stay indoors during spraying.
- Close windows and turn off fans that bring outdoor air inside during the spraying period. Home air conditioners can be left on since they do not draw air from outdoors. Car air conditioners should be set to re-circulate inside air.
- Remove children's toys, outdoor equipment and clothes from outdoor areas. (If toys are left outside, wash with soap and water before using again.)
- Wash skin and clothing exposed to pesticides with soap and water.
- Anyone experiencing adverse reactions to pesticides should call their doctor or the local poison control.

If you reside within a mosquito abatement district consult your mosquito abatement district for pesticide information.

If you reside outside of an established mosquito abatement district, information on pesticides and mosquito control can be found on the Internet. Several informative sites are listed below:

For more information about pesticides and mosquito control, visit the EPA website at <http://www.epa.gov/pesticides/health/mosquitoes/>.

Exttoxnet: <http://exttoxnet.orst.edu/faqs/index.htm>

The Centers for Disease Control and Prevention (CDC)
<http://www.cdc.gov/ncidod/dvbid/westnile/index.htm>, and

The National Pesticide Information Center at <http://npic.orst.edu/>

Commercial mosquito control operations and licensed professional pesticide applicators may be able to provide additional information specific to your location.

Equine Protection Options

1. Vaccination

Equine vaccines are available through veterinarians and selected feed and tack stores. Adequate vaccination requires annual boosting.

To learn more about Merial RecombiTEX[®] vaccine: <http://www.equinewnv.com/>

To learn more about Fort Dodge West Nile-Innovator[™] vaccine
<http://www.equinewestnile.com/index.htm>

2. Mosquito Avoidance for Farm Animals

Mosquitoes require standing water to reproduce. By eliminating, reducing or treating standing water on your property, you will help prevent the mosquito population from growing. Sources of standing water and ways to treat or eliminate them include:

Water troughs and buckets -- Scrub troughs to remove algae and replace water at least weekly if feasible. Make sure that the drained water does not pool or stand for more than three days.

Clogged gutters and drains -- Keep gutters and drains clean; use larvicide's briquettes** or equivalent product if standing water cannot be eliminated.

*** Larvicidal briquettes are small pellets containing *Bacillus thuringiensis israelensis* (BTI), which are designed to be placed in water. They kill mosquito larvae for about 30 days and may be purchased in home improvement stores. Be sure to follow directions found on the label.*

Old tires -- Remove, cut, or treat all old tires on your property - including tire dumps and those used to hold down tarps.

Wash stalls and collection drains under wash stalls -- Use larvicide's briquettes or equivalent product in collection drains if water collects and stands for more than three days.

Animals should be kept off of pasture areas that are being irrigated. Deep hoof prints may hold enough pooled water to produce mosquitoes and create a hazard that can be avoided.

Any natural water including ponds, brooks, streams, and wetlands -- Call your local mosquito abatement district for an assessment. (This service is provided at no charge to district residents.) In all other situations one should check with the agency with jurisdiction over the waterway. This may involve state and federal agencies and some local agencies in the situation of drainage districts that follow traditional natural drain ways.

Private ponds (artificial ponds) These ponds should be examined for mosquito development site potential. These ponds may contain fish, which consume mosquito larvae so control methods should be tailored to each pond.

Drainage ditches and waste water lagoons on the farm or storm drains surrounding the farm -- Use larvicide's briquettes or equivalent product in ditches on the farm and call your county mosquito agency regarding storm drains surrounding the property.

Standing puddles on ground or in tarps -- Try to prevent water from accumulating in puddles. If this is not possible, eliminate the water by sweeping it out or otherwise removing it if it stands for longer than three days.

3. Maintain immune system:

Keep your horse's health maintained as recommended by your veterinarian (including vaccines, parasite control and nutrition) to optimize immune function. A weakened immune system may leave your horse more susceptible to infection from the WNV.

C. Web sites and Communication Strategies

Idaho Sites:

Idaho Department of Health and Welfare West Nile virus website:

www.westnile.idaho.gov

Information is available on human health, pesticides, Idaho data, and public education (Fight the Bite campaign).

Title 39, Chapter 28, Idaho Code: IDHW statutes regarding mosquito abatement districts <http://www3.state.id.us/idstat/TOC/39028KTOC.html>

Idaho State Department of Agriculture - Animal Health Information:

<http://www.agri.state.id.us/Categories/Animals/animalHealth/healthdisease.php#WNV>

Idaho State Department of Agriculture - Pesticide Applicator Information:

<http://www.agri.state.id.us/Categories/Pesticides/Toxicology/indextoxicology.php>

Idaho Department of Fish and Game

http://fishandgame.idaho.gov/cms/wildlife/manage_issues/wnv/

Additional Sites:

Association of State and Territorial Health Officials

“Public Health Confronts the Mosquito: Developing Sustainable State and Local Mosquito Control Programs”

http://www.astho.org/?template=mosquito_control.html

The Centers for Disease Control and Prevention

<http://www.cdc.gov/ncidod/dvbid/westnile/index.htm>

Environmental Protection Agency (EPA):

<http://www.epa.gov/pesticides/health/mosquitoes/>

Exttoxnet (Extension toxicology network): <http://ace.ace.orst.edu/info/exttoxnet/>

The American Mosquito Control association web site, found at

<http://www.mosquito.org/>, provides links to numerous commercial companies that may provide training. One such opportunity is known as the Mosquito University sponsored by Clark Mosquito Control. Other training opportunities may be available.

The Northwest Mosquito and Vector Control Association offers training sessions, typically twice a year. Check the web page at <http://www.nwmvca.org/>

Reference and resource materials for response levels:

Centers for Disease Control and Prevention

“Epidemic/Epizootic West Nile Virus in the United States: Guidelines for Surveillance, Prevention, and Control” 2003

<http://www.cdc.gov/ncidod/dvbid/westnile/index.htm>

California

2007 California Mosquito-borne virus Surveillance and Response Plan

<http://www.westnile.ca.gov/resources.php>


Sacramento-Yolo County Mosquito Abatement District

<http://www.fightthebite.net/publiceducation/chemical.php>

2007 “Fight the Bite” Campaign

Brochures and posters in English and Spanish may be downloaded from the IDHW web site: www.westnile.idaho.gov or may be obtained by contacting your local Health District.

You Can...Report Dead Birds
Dead crows, magpies, ravens, jays and hawks are usually an early warning sign that mosquitoes carrying WNV are in your area. If you find one of these birds, call your local Fish and Game office. By calling, you can help monitor where WNV may be. Always wear latex or rubber gloves if you handle any dead animals.



You Can...Promote Community Action


- Reducing mosquito breeding habitat in the community helps everyone. Reduce over-watering in parks, golf courses and public recreation areas and talk to your homeowners' association about controlling mosquito populations in community catchment ponds. Pesticides can be extremely dangerous if not applied correctly. Application of pesticides in community settings should be left to licensed applicators so that residents and the environment are not harmed.
- Counties and communities can form mosquito abatement districts to help control mosquito populations. Abatement districts develop effective, long-term plans to control mosquito populations and are funded through local taxation. By Idaho law, abatement districts are the only public entity that can provide area-wide mosquito control. Contact your county commissioners about forming a mosquito abatement program in your community today.

For More Information
www.westnile.idaho.gov
Follow the links for information on public health.


- General Health
- Pesticides
- Animal Health
- Birds, Wildlife and WNV

If you have other health-related questions, please contact your District Health Department or your healthcare provider.

West Nile Virus Information Line
1-877-333-WNV1 (9681)
Treasure Valley West Nile Virus
Information Line - 334-6500



Fight The Bite



West Nile Virus

West Nile Virus is here to stay in Idaho.

You can protect yourself with a few easy steps.

Protect Yourself!

In addition to print material, radio and television messages have been developed. Public service announcements (PSAs) developed in 2007 may be viewed from the IDHW web site www.westnile.idaho.gov.



Section 3

Mosquito Abatement

- A.** Mosquito facts and mosquito control myths
- B.** Idaho abatement district statutes
- C.** Pest management plan development guide
- D.** West Nile virus phased-response guidance for counties in Idaho
- E.** Budget estimates for start-up operations
- F.** Special considerations for pesticide application, other control methods
- G.** Frequently asked questions from areas lacking abatement districts

A. Mosquito Facts and Mosquito Control Myths

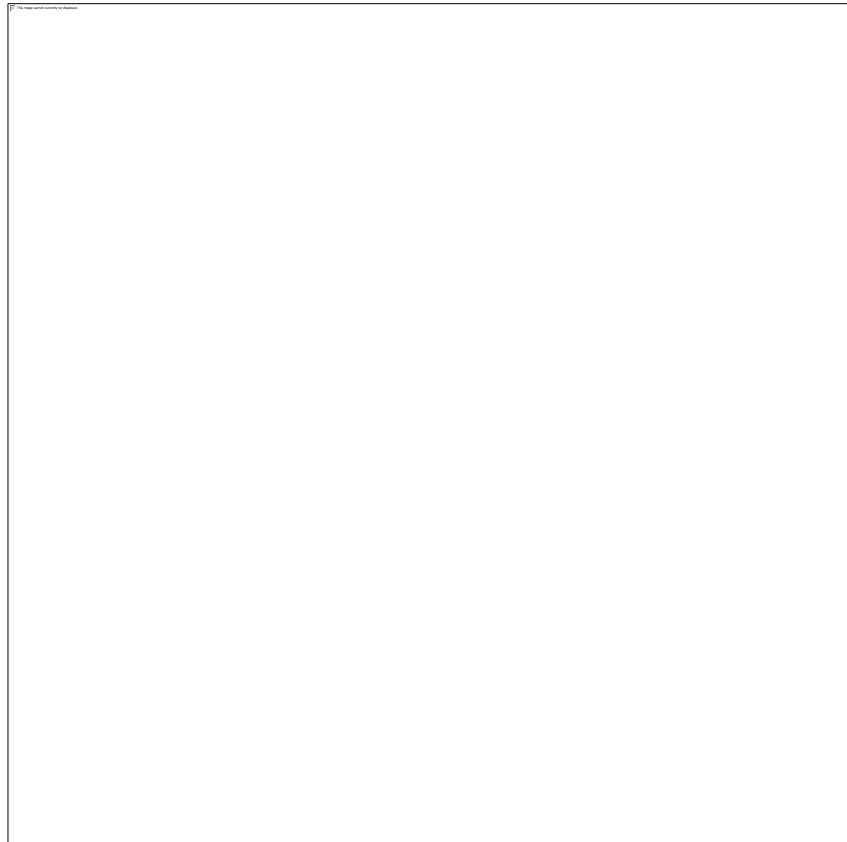
I. Mosquito Facts

Mosquito bites:

- **May Cause**
 - Mosquito-borne diseases
 - Allergic reactions
 - Annoyance
- **May Reduce**
 - Human productivity due to health issues
 - Outdoor enjoyment and recreation
 - Real estate and tourism revenues
 - Weight gain in livestock
 - Milk production in dairy cattle
 - Livestock reproduction and survival
 - Wildlife populations
- There are approximately 3,000 different species of mosquitoes throughout the world, of which 170 to 200 species are found in the United States. Approximately 25-30 species are found in Idaho.
- Mosquitoes need a standing water source to develop. Any standing water source such a marsh, pond, storm water retention pond, flooded field, uncovered boat, discarded tire, swimming pool, bird bath, and still water areas along a ditch, canal, creek or lake can develop mosquitoes.
- Female mosquitoes bite because a blood meal is required for egg production. Only female mosquitoes bite. Male mosquitoes do not bite - they feed solely on plant nectar.
- Female mosquitoes can take multiple blood meals and produce multiple generations during a single mosquito season. Under optimal conditions, a female *Culex* mosquito will lay 200 to 400 eggs every three days.
- Only one male is required to fertilize a lifetime of egg production in the female.
- Most eggs hatch into mosquito larvae within 24 - 48 hours.
- *Culex tarsalis*, a common Idaho mosquito and major vector for West Nile virus, may go through its life cycle in 14 days at 70° F, but may take only 10 days at 80° F (Figure 4).

- Mosquitoes generally live one to two months. *Culex* species adults may overwinter and survive until the next year.
- Mosquitoes typically fly only a mile or two from their source but can fly up to fifteen or more miles in a single night, depending on the species.

Figure 4: Mosquito life-cycle



Source: American Mosquito Control Association <http://mosquito.org/mosquito-information/lifecycle.aspx>

II. Mosquito control myths:

- Sound and electric devices – while touted as repellents, these devices have no repellency effects and units are sold with no documented test results.
- Citronella (plants and candles) - there are no data to support the claim that citronella is a good mosquito repellent, its pleasant odor does not guarantee results.
- Skin moisturizing oil - field tests do not support claims that certain skin oils will repel mosquitoes. Mosquitoes are 30 times more sensitive to DEET than to skin moisturizers.
- Bug zappers – while purchased by consumers hoping to reduce mosquito exposures, mosquitoes actually comprise less than 5% of the total bug zapper catch. The zappers kill many beneficial insects and tend to attract more insects than they kill.
- Birds – while some claim that certain birds can reduce mosquito populations, ornithologists state that purple martins and other swallow-like birds do not prefer mosquitoes and that mosquitoes make up less than 3% of their diets.
- Bats – while some claim that bats can reduce mosquito populations, insectivorous bat diets consist mainly of beetles, wasps, ants, flies, stoneflies, mayflies, moths and grasshoppers. Mosquitoes make up less than 1% of their diet. Location of bat houses should also take into consideration that bats sometimes carry rabies. Separation of bat houses from human populations is a good practice.

B. Idaho Abatement District Statutes, as amended in 2007.

Idaho Mosquito and Vermin Abatement Act.

Idaho Code TITLE 39 HEALTH AND SAFETY CHAPTER 28

39-2801. DEFINITIONS

39-2801A. AUTHORIZATION TO FORM ABATEMENT DISTRICTS

39-2802. PROCEDURES FOR FORMATION OF ABATEMENT DISTRICTS

39-2803. SELECTION OF OFFICIALS OF ABATEMENT DISTRICTS

39-2804. POWERS AND DUTIES OF ABATEMENT DISTRICTS

39-2805. METHOD OF FINANCING ABATEMENT DISTRICTS

39-2806. ANNEXATION TO ABATEMENT DISTRICTS

39-2807. CONSOLIDATION OF ABATEMENT DISTRICTS

39-2808. EXISTING RIGHTS PRESERVED

39-2809. SHORT TITLE

39-2810. WITHDRAWAL

39-2811. HEARING OF PETITION FOR WITHDRAWAL

39-2812. PESTS – PUBLIC HEALTH AND WELFARE – EMERGENCIES – INTERIM ABATEMENT DISTRICTS

39-2813. RATION OF ABATEMENT DISTRICTS BY COUNTY

39-2814. SEVERABILITY

39-2801. Definitions. When used in this chapter:

(1) "Vector" means an animal, such as an insect, that transmits a disease producing organism from one host to another.

(2) "Vermin" means small animals, including insects, of public health and welfare concern which are difficult to control when they appear in large numbers.

39-2801A. Authorization to form abatement districts. There may be formed, under the provisions of this chapter, districts for the abatement of mosquitoes or other vermin of public health and welfare importance, in any area of the state from territory of one (1) or more counties, one (1) or more cities or towns, or any combination or portion thereof. No district shall contain noncontiguous areas except where a noncontiguous area of land consisting of not less than forty (40) contiguous acres, is separated from the district by public property owned by the federal, state or local government, such noncontiguous land may be included in the district by election or agreement of the private property owners. Any abatement district formed under this chapter, including an interim district formed

under the provisions of section 39-2812, Idaho Code, shall be governed by the provisions of section 39-2804, Idaho Code.

39-2802. Procedures for formation of abatement districts. (1) Abatement districts may be formed in the following ways:

(a) Upon presentation to the board of county commissioners of a petition requesting the formation of an abatement district, which is signed by property owners of the territory of the proposed abatement district, equal to not less than ten percent (10%) of the property owners within the proposed district, the commissioners shall publish such petition when the following conditions are met: the petition must define the boundaries of the proposed district and assessed tax valuation of the property therein. When the above conditions have been met the county commissioners shall publish the petition, and if after thirty (30) days no protests are received, an election must be held on a regularly scheduled election date specified in section 34-106, Idaho Code. The abatement district shall bear the expense of holding their portion of the election upon their successful formation from the first tax moneys collected. If there are written protests, the county commissioners must hold a public hearing within thirty (30) days after receipt of the written protests and after the hearing hold an election. Notice of the time and place of such election shall be published at least once not less than twelve (12) days prior to the election and a second time not less than five (5) days prior to the election in at least one (1) newspaper having general circulation in the proposed abatement district.

(b) The board of county commissioners may place the question on a ballot during either a primary or general election as to whether to create an abatement district. If the board of county commissioners determines to place such a question on the ballot, it shall be after they define the boundaries of the proposed district and assessed tax valuation of the property therein. Notice of the time and place of such election shall be published at least once not less than twelve (12) days prior to the election and a second time not less than five (5) days prior to the election in at least one (1) newspaper having general circulation in the proposed abatement district.

(2) No person shall be entitled to vote at any election held under the provisions of this chapter unless he shall possess all the qualifications required of electors under the general laws of the state and be a resident of the proposed district. A majority of the votes cast by the qualified electors shall establish the district.

39-2803. Selection of officials of abatement districts. A five (5) member board of trustees shall be appointed from within the area of the proposed abatement district to govern the abatement district. The trustees appointed shall at the first meeting of each year elect a president, secretary and treasurer to serve during the ensuing year. The officers of the board shall be bonded to the extent of five hundred dollars (\$500) to five thousand dollars (\$5,000) each as set by the county commissioners. The members of the board shall be appointed by the county commissioners of the county which they are to represent. When two (2) or more counties or portions thereof comprise an abatement district, the selection of trustees will be made by mutual agreement of the county commissioners concerned.

Each trustee shall be a resident property owner and a registered voter. Trustees shall be appointed for four (4) years on staggered appointments. To initiate the board two (2) members are appointed for two (2) years, one (1) for three (3) years and two (2) for four (4) years. Subsequent appointments shall be for four (4) years. Trustees shall serve without compensation but will be reimbursed for necessary expenses involved with the performance of their official duties. The county health officer and the county agent shall be ex officio members of the board. Whenever two (2) or more counties or portions thereof are included in the district, the health officer and county agent for each county shall be ex officio members of the board. The [directors or] heads of the following state departments or their designated representatives shall be considered ex officio members of the board and may be called upon for their advice and assistance in the handling of abatement problems affecting their direct interests: agriculture, fish and game, lands, transportation, water resources and health and welfare.

39-2804. Powers and duties of abatement districts. The abatement district board of trustees is authorized:

- (1) To appoint a director to direct the activities of the district, in accordance with training and experience necessary to fulfill the duties of the position.
- (2) To appoint such other persons as necessary, determine their duties and compensation, and make rules and regulations respecting them.
- (3) To take all necessary and proper steps for the control of mosquitoes and other vermin of public health and welfare importance in the district and for these purposes shall have the right to enter upon any and all lands.
- (4) To sue and be sued.
- (5) To contract to purchase, hold, dispose of, and acquire by gift real and personal property in the name of the district. To exercise the right of eminent domain and for these purposes to condemn any necessary land or rights-of-way in accordance with general law.
- (6) To abate as nuisance breeding places of mosquitoes or other vermin of public health and welfare importance within the district or within migrating distance of the district by use of chemicals or permanent control measures and in this connection have the right to enter upon any and all lands.
- (7) To work with the lateral ditch water users associations, irrigation, drainage and flood control districts and other cooperating organizations. The board of trustees of the abatement district may supplement funds of cooperating organizations for improvement, repair, maintenance and cleaning of ditches which will temporarily or permanently eliminate mosquito breeding or for other activities which will benefit the district.
- (8) To file annually with the board of county commissioners for their approval an estimate of funds required for the next year, a plan of the work to be done, and methods to be employed. No procedure, work or contract for any year of operation shall be done or entered upon until plans and budget have been jointly approved by the board of county commissioners.
- (9) To file, annually or by February 1 of the succeeding year, with the board of county commissioners a report setting forth the moneys expended during the previous year, methods employed, and work accomplishments.

(10) To approve a written mosquito or other vermin management plan submitted by a landowner requesting that their property be excluded from treatment by the abatement district. Such plan must be specific to the landowner's property, provide adequate control measures, and be implemented by the landowner. The abatement district shall refrain from treatment of property included in the approved plan, but shall maintain monitoring and surveillance activities. If the landowner fails to follow the plan or does not provide adequate control measures, the abatement district may abate the mosquitoes or other vermin.

(11) To cooperate with other entities. At its discretion, a district may cooperate with and enter into annual agreements or contract with governmental agencies of this state, other states, agencies of the federal government, private associations, and private individuals in order to carry out the purposes and provisions of this chapter.

39-2805. Method of financing abatement districts. The board of county commissioners must levy upon taxable property within the district a tax at a rate not greater than sufficient to raise the amount determined by the board of trustees as approved by the board of county commissioners, as necessary for the operation of the district for the ensuing year. In no event shall such tax exceed one tenth percent (.1%) of the market value for assessment purposes on all taxable property within the district. All taxes thus levied shall be collected in the same manner as other taxes and deposited to the credit of the abatement district and shall be used for no other purposes. Such funds may be withdrawn from the county treasury and upon warrant of the board of trustees of the abatement district, signed by the president of the board and countersigned by its secretary, for the activities of the abatement district.

39-2806. Annexation to abatement districts. Contiguous territories may be annexed to organized abatement districts upon petition of a majority of the legal voters in the territory seeking annexation and of the owners of more than half, by assessed value, of the taxable property in such territory, or by written request for annexation of a designated area, submitted to the trustees of the existing abatement district and signed by all members of the board of county commissioners in which county the territory seeking annexation is located. For annexations that will increase the size of an existing contiguous district, there shall be no size restriction on the property being annexed. Noncontiguous areas shall not be annexed unless the area meets the provisions of section 39-2801A, Idaho Code. Upon receiving this petition or written request, the trustees of the existing abatement district must submit the question of annexation to the legal voters of the district at an election held subject to the provisions of section 34-106, Idaho Code.

39-2807. Consolidation of abatement districts. Two (2) or more contiguous districts may be consolidated. Any district board of trustees may seek consolidation by adoption of a resolution by a majority vote of its members. Consolidation is accomplished by a majority vote of the members of each of the boards of trustees involved in the consolidation. The consolidated districts may enter into arrangements for pooling funds and joint use of personnel, equipment, and supplies. The activities conducted under joint arrangement shall be considered as if conducted directly by the board having jurisdiction

over the area concerned. The board of county commissioners must be given written notice of consolidation.

39-2808. Existing rights preserved. It is the purpose of this act to provide additional and cumulative remedies to prevent, abate and control the spread of mosquitoes and/or other vermin affecting the public health, safety and welfare of the people of the state of Idaho. Nothing herein contained shall be construed to abridge or alter rights of action or remedies in equity or under the common law or statutory law, criminal or civil, nor shall any provision of this act, or an act done by virtue thereof, be construed as estopping the state or any municipality or person in the exercise of their rights of equity or under the common law or statutory law to suppress or abate nuisances.

39-2809. Short title. This chapter may be cited as the "Idaho Mosquito and Vermin Abatement Act."

39-2810. Withdrawal. Any portion of an abatement district which will not be reasonably benefited by remaining within such district may be withdrawn as in this section provided. Upon receiving a petition signed by fifty (50) or more landowners within the portion desired to be withdrawn from any abatement district, or by a majority of such landowners, if there are less than one hundred (100) landowners within the portion sought to be withdrawn, requesting the withdrawal of such portion from the district on the ground that such portion will not be reasonably benefited by remaining in said district, the board of county commissioners shall fix a time for hearing on such petition and for hearing protests to the continuance of the remaining territory as an abatement district. The hearing shall not be less than ten (10) days nor more than thirty (30) days after the receipt thereof. The board shall, at least one (1) week prior to the time so fixed, publish notice of such hearing by one (1) publication in a newspaper of general circulation in the district, which the board deems most likely to give notice to the inhabitants thereof, of the proposed withdrawal.

39-2811. Hearing of petition for withdrawal. Any person interested may appear at the hearing and object to the withdrawal of the portion from the district, or may object to the continuance of the remaining territory as an abatement district. The board of county commissioners shall consider all objections and shall pass upon the same, and if it finds that portion of the district sought to be withdrawn will not be reasonably benefited by remaining within the district, and the territory not sought to be withdrawn will be reasonably benefited by continuing as an abatement district, it shall grant the petition and enter an order thereon upon its records. In the event the board finds the district will not be reasonably benefited by continuing as an abatement district, it shall enter an order upon its records completely dissolving and terminating the previously existing abatement district. Upon the withdrawal of any territory from an abatement district, as in this section provided, all property acquired for the district shall remain vested in the county and be used for the purposes of the district. Upon complete dissolution of an abatement district as herein provided, all property acquired for the district shall remain vested in the county and be used for any general purpose of the county.

39-2812. Pests -- Public health and welfare -- Disasters -- Emergencies -- Interim abatement districts. (1) To provide for the timely response to an elevated or anticipated pest population that may constitute a risk to public health and welfare, the board of county commissioners of each county of this state, in collaboration with duly recognized local and state officials, and after a public hearing is called for such purpose as a special meeting pursuant to the provisions of section 67-2343(2), Idaho Code, is hereby granted full power and authority to declare such pests as public health and welfare pests, and to initiate activities to hinder in the potential spread of disease, or adverse economic impact, caused by these pests by taking appropriate steps to intervene in the natural biological cycle of the pests or disease.

(2) Boards of county commissioners are further authorized and empowered, in the event of a disaster or emergency declared by such boards, to make direct appropriations for the purpose of controlling public health and welfare pests as declared pursuant to this section. All moneys raised by direct appropriation shall be placed in a county public health and welfare pest fund, which shall be used exclusively for the control of pests of public health and welfare significance and for payment of all necessary expenses incurred in such control program. In addition, the county may impose an annual property tax assessment pursuant to section 39-2805, Idaho Code, and in accordance with the provisions of sections 63-802 and 63-803, Idaho Code, for the term of the disaster or emergency or until all expenses incurred during the disaster or emergency have been recovered. Such fund shall be a revolving fund and all moneys returned to the fund under any of the provisions of this chapter shall continue to be available for the operation of the control program.

(3) The disaster or emergency declaration of a pest of public health and welfare significance within a county and subsequent pest management activity shall, except as provided herein, place the whole county into an interim abatement district for administrative purposes for no more than two (2) years. The transition of an interim abatement district into a formally defined abatement district, shall be brought to a vote of the electorate within twenty-four (24) months of the declaration, subject to the notification and establishment requirements provided in this chapter and conducted during a general election held on the first Tuesday following the first Monday in November of even numbered years, and if passed, the district shall be recognized and the provisions of this chapter shall be implemented. If the measure fails, the balance of revolving fund moneys shall be distributed as required by state law. In the event the disaster or emergency exceeds the county's capacity or resources, provisions should be made to request state or federal disaster or emergency funds to address the evolving situation. If the interim abatement district provides the same service as an existing abatement district, the interim abatement district shall exclude any area within an existing abatement district.

39-2813. Operation of abatement districts by county. Any district board of trustees may seek operation of the district by the board of county commissioners by adoption of a resolution by a majority vote of its members and by a majority vote of the board of county commissioners. The board of county commissioners may provide by ordinance that the abatement district board of trustees shall function as an advisory board to the board of county commissioners. If such an ordinance is adopted, the board of county

commissioners shall retain and may exercise the powers, duties and responsibilities otherwise charged to the abatement district board of trustees by the provisions of this chapter. Any such ordinance shall set forth the powers, duties, responsibilities, compensation, and terms of office of the abatement advisory board and may provide for any such other rules under which the abatement advisory board shall advise the board of county commissioners and conduct its operations. Any such ordinance may be repealed at any time and, if repealed, the provisions of this chapter shall apply as if no such ordinance had been adopted.

39-2814. Severability. The provisions of this chapter are hereby declared to be severable and if any provision of this chapter or the application of such provision to any person or circumstance is declared invalid for any reason, such declaration shall not affect the validity of the remaining portions of this chapter.



C. PEST MANAGEMENT PLAN* (PMP) **DEVELOPMENT GUIDE FOR IDAHO MOSQUITO** **ABATEMENT DISTRICTS**

This plan guidance provides:

- Basic integrated pest management (IPM) principles,
- Desired abatement action benchmarks,
- Plan management plan components, and
- Model standard operational procedures

These guides are provided to assist in the development of a pest management plan to implement control activities at the local level.

The guide is not meant to be a complete text on mosquito management.

For additional information, visit the following websites:

Association of State and Territorial Health Officials
http://www.astho.org/?template=mosquito_control.html

American Mosquito Control Association (AMCA)
<http://www.mosquito.org/>

Centers for Disease Control
<http://www.cdc.gov/ncidod/dvbid/westnile/index.htm>

Northwest Mosquito and Vector Control Association
<http://www.nwmvca.org/>

* All mosquito abatement districts in Idaho are required by law in Idaho Code § 39-2804(8), to develop an annual plan and budget for the work to be done and control methods to be employed.

Integrated Pest Management (IPM) Principles:

IPM is a “**decision making process**” in which all control techniques are considered and a pest management plan is developed prior to initiating control activities. Identification of the pest and knowledge of the pest’s biology and behaviors are key elements in the consideration of control methods. As control methods are initiated, monitoring and surveillance of pest populations is key to measure the effects of those control activities. Based on these measurements, the pest management plan may be adjusted, as needed, to improve success.

In the IPM process, pest control methods are considered in the following order or “hierarchy.”

1. **Cultural** – Sanitation, irrigation practices, vegetation management, etc.
2. **Biological** – Conserve, enhance, and introduction of biological agents to establish a sustainable ecological balance; i.e. mosquito fish, dragonfly nymphs, bats, and birds.
3. **Physical / Mechanical** – Drainage projects, habitat modification / reduction, and trapping.
4. **Chemical** –Larvicides and adulticides, choice of pesticide products must take into account the target pest, target pest’s biology and behavioral traits, habitat, timing of application and target pest selectivity.

Chemical control agents are to be considered last in this hierarchy in order to facilitate alternative, sustainable control measures, reduce pesticide use and potential exposure to man, animal and the environment.

In the management of mosquitoes it has been stated that one acre of appropriate larva control is equivalent to 100 acres of adult control. Larva control tends to be more environmentally and politically acceptable and less invasive operationally than the application of adulticides. An operational concept is that 75% of the budget for a sustainable mosquito management program should be used for larva control activities.

Aerial applications should only be considered as a feasible disease intervention technique when disease outbreak indicators are present suggesting ongoing disease transmission, and other methods of mosquito control have not yielded satisfactory results. Aerial operations deliver mosquito control agents to a wide area in a timely manner but require considerable resources for notification and education of general public.

Consider the IPM principles when deciding what control techniques to select or implement in your area.

Desired Action Benchmarks: Benchmarks are suggested as a means to define how a county may wish to approach the threat of WNV.

Proactive:

- a) Control areas defined,
- b) Adequate staff and equipment to implement control plan,
- c) Educational elements in place,
- d) Surveillance and species identification activities established and implemented at the local level during the mosquito season, and
- e) Good reporting and planning functions operational

Active:

- a) Control areas defined,
- b) Adequate staff and equipment to implement control plan, and
- c) Good reporting and planning functions operational

Passive:

- a) Control areas proposed, and
- b) Staff identified and equipment available to respond to known outbreak

No action intended:

- a) No action is an action: mosquitoes not considered a problem.

Pest Management Plan (PMP) Components: developing the plan.

The following components will help you organize your data and thoughts for plan development. These are essential elements of a comprehensive and integrated mosquito management program and need to be addressed as you develop your pest management plan. The components are not “all inclusive” but the listed components do cover the major points and will provide the foundation for a sustainable and evolving operation. Consideration of local conditions and attributes should be interjected into the plan to address the specific issues unique to each area considered for pest management.

Component #1: Description of the geographic area(s) to be covered by the control program and the number of acres in the project. Also, estimate the human population within the proposed geographic area.

Component #2: Collaborative arrangements (if applicable), may occur between municipalities, counties, state / federal agencies, tribal governments, and existing mosquito abatement districts (MAD). Due to the nature of the program and the limited amount of trained personnel and specialized equipment (ULV foggers), cooperative agreements, mutual aid agreements or joint ventures (multi-county effort) may be considered. If this is the case, describe how the arrangements will work with each cooperating entity.

Suggested entities to contact during the plan development and implementation phases:

1. Neighboring county commissioners
2. Idaho Health Districts
3. County extension educator

4. Idaho Department of Health and Welfare, Office of Epidemiology and Food Protection and the Bureau of Community and Environmental Health
5. Idaho State Department of Agriculture; Animal Industries and Agriculture Resources (pesticide coordinator)
6. Idaho State Department of Fish and Game
7. Idaho Department of Environmental Quality
8. Idaho Department of Parks and Recreation
9. Idaho Bureau of Homeland Security
10. Federal land management agencies; UDSA, BLM, USFS, BOR, USF&WS
11. Native American / Tribal Agencies
12. Idaho Counties Risk Management Program
13. Irrigation districts
14. Registered beekeepers
15. Registered organic growers
16. Local media contacts
17. Contract service providers

Component #3: Surveillance/Population Monitoring

Provide a description of mosquito surveillance or population monitoring activities.

- Larva identification and larva (mosquito) population monitoring in mosquito development areas by (e.g., ponds, standing water) and within populated areas such as rural communities, cities or recreational attractions with areas of standing water.
- Adult mosquito identification and population monitoring by various trapping techniques (e.g. CO₂ light trap, gravid trap). Different trap types capture different kinds of mosquitoes so explain data desired from trap type.
- Be aware of human West Nile occurrence data provided by the Idaho Department of Health and Welfare reported routinely on the WNV surveillance summary table at <http://www.westnile.idaho.gov>.
- Be aware of bird activity from your area. Contact the Idaho Fish and Game Regional WNV representative regarding sentinel bird species and test results or be aware of confirmed bird case data from your area by reviewing test results routinely reported on the WNV surveillance summary table at <http://www.westnile.idaho.gov>.
- Be aware of confirmed equine case data from your area by reviewing data from the Idaho Department of Agriculture which can be found on the WNV surveillance summary table at <http://www.westnile.idaho.gov>.

Component #4: Mapping

Provide a description of the methods for recording geographic data to support the control program. Global Positioning System (GIS) and Geographic Information System (GIS) data is relatively easy to collect in the field and, depending on support resources, can be a great tool for mosquito control operations. Maps and field notes are tools routinely used for this component. Maps are routinely referenced when control activities are conducted. Maps serve as critical reference points in the maintenance of pesticide application records.

- Identify mosquito development sites and harborages in your area and keep a map of these important sites for control purposes.

Component #5: Source Reduction

Describe what county / community-wide method(s) or strategy(ies) will be used for identifying and reducing mosquito development areas and harborages.

- Elimination or modification of containers (i.e. old tires, debris, etc.), so that water does not accumulate. Engage the community in this effort in their own yards and in the community at large.
- Improving drainage / elimination of standing water, (i.e. clean drain ditches and culverts, alter irrigation practices to prevent long term, [3 or more days], accumulations of surface water).
- Adoption of local ordinances to remove or modify conditions which contribute to mosquito development (i.e. improper irrigation techniques, non-maintained landscape and water features).

Component #6: Larva Control

- Describe your methods and timing of larva control.
- Select registered larvicide products for the various applications needed.
- Develop plans for larvicide applications to areas of standing water, storm sewers, etc. so that control is carried out to reduce mosquito development in those areas.
- Describe how you will monitor effectiveness of larvicide applications (example: measure larva numbers before and after larvicide application).
- If federal wetlands are considered the source of the adult mosquitoes, develop a surveillance plan and document observations for discussions with federal land managers.

Component #7: Control of Adult Mosquito Populations

- Describe proposed trapping methods and data anticipated to be collected from each trap type to document the number and relative type of mosquito species in the area, over the months when mosquitoes are active.
- Describe how you will identify mosquitoes by species and how you will develop local capacity to maintain this activity.
- Describe how you will identify harborages (places where mosquitoes grow and hide).
- Describe methods for selecting and applying adulticide.
- Describe ULV equipment calibration and documentation.
- Provide information on timing of adulticide applications to inform constituents.
- Provide information on how you will monitor application effectiveness.
- Provide description of pesticide and ULV equipment storage and security provisions.
- Provide information related to waste management for pesticide containers and rinsates.

Component #8: Certification /Staffing

- Provide anticipated staffing levels for the mosquito control program.
- Provide information related to the pesticide applicators' licensure (Public Health "PH" Category).
- Provide information on the proposed initial and on-going staff education and training that will be provided.

Component #9: Public Education and Awareness

Describe any information, resources, campaigns, or announcements that will be provided in conjunction with your mosquito prevention and control program.

- Personal protection campaigns
- Source reduction campaigns
- Control effort awareness
- Community partners efforts
- Announcements in the media of adulticiding times and locations
- Notification of identified beekeepers, organic farmers and sensitive individuals prior to enhanced mosquito prevention activities.

Component #10: Budget

- Provide a detailed budget for planned activities, please note budget guidance in Section 3–F of this document. [required by Idaho Code § 39-2804(8)].

Component #11: Outlook for Long-term Sustainability

- Provide a description of the long-term sustainability of the mosquito control program in your area.
- Describe end-of-year report to County Commissioners [required by Idaho Code § 39-2804(9)].

For an example of a functioning PMP from South Dakota, please visit the following web site and view their ‘Sample Mosquito Control Plan’:

<http://www.state.sd.us/doh/WNVgrants/index.htm>

Another example may be found at the Sacramento-Yolo Counties Mosquito and Vector Control page: “Mosquito and Mosquito-borne disease management plan”

<http://www.fightthebite.net/contact.php>

Model Standard Operating Procedures

A. Function and scope of mosquito abatement districts.

B. Surveillance and Monitoring

- Identify adult mosquito species
- Test adult mosquitoes for the presence of virus
- Survey and map mosquito development habitat (source)
- Evaluate mosquito larvae density in development habitats
- Determine level of adult mosquito activity in defined area

C. Prevention

- Source reduction, modification and elimination
- Larvicide application in mosquito development habitats

D. Intervention

- Adult mosquito reduction
- Threshold determinations for abatement activities

Implementing the plan:

A. Function and Scope of Mosquito Abatement Districts (MADs):

Mosquitoes have both positive and negative impacts on the environment. Mosquitoes provide a food source for fish and other aquatic organisms. They are also food for bats, birds, spiders, and dragonflies. However, they are also known to transmit pathogens, such as bacteria, parasites or viruses, causing disease worldwide. Examples of mosquito-borne diseases include malaria, numerous encephalitis viruses, yellow fever, dengue fever and West Nile virus.

The primary function of MADs are to protect the public's health and safety from mosquito-borne diseases. Additionally, as public health protection is fulfilled MAD programs reduce pest mosquito populations. Successful abatement programs improve the quality of life, promote economic development, and facilitate enjoyment of natural and man-made attractions. In order for a MAD to be effective in its functions it must implement necessary integrated pest management control measures over a large geographic area.

It is important that a qualified manager be identified to develop and implement the elements of the pest management plan, provide leadership to staff members and demonstrate program accountability to county administration. Once this person has been selected, notify other appropriate agencies, such as the IDHW epidemiologist so the contact information may be added to a master list of mosquito abatement operators for ongoing distribution of vector control related information.

B. Surveillance/Monitoring:

Numerous mosquito species may transmit (vector) disease to humans or animals. However, many common mosquitoes are only pests, not responsible for disease transmission, per se, but may still present economic and recreational challenges or impediments to a community and should still be controlled. It is important to become familiar with the various species of mosquitoes in your area and your unique control challenges.

Mosquito development habitats:

Development habitats are identified, described and ideally mapped and cataloged by GPS coordinates. The most effective method of mosquito control is the reduction, modification, or elimination of mosquito development habitats. This form of control cannot be accomplished in many cases due to legal, fiscal and environmental constraints. Mapping of mosquito development habitat locations can help with source reduction activities and strategically pinpoint target areas for community education efforts and/or insecticide application.

Mosquito Surveillance:

In order to determine what type and where specific mosquito species exist in your area it is necessary to trap and identify them. For more thorough information on establishing mosquito surveillance in your area contact the IDHW Office of Epidemiology and Food Protection.

- **Monitoring/Inspection for larvae:** Timely inspections and evaluations of mosquito larvae populations in aquatic habitats, by dip-collection, is a key tool to determine the mosquito growth phase and relative numbers. As mosquito larvae emerge; mosquito management activities are applied to the development habitats to prevent them from becoming biting adults. (See prevention and threshold determinations below).
- **Adult mosquito monitoring:** Tracking the presence or absence of different mosquito species over the warmer months is important to understand when vector species (primarily the Culex mosquitoes) emerge and how many are present in an area. The presence or absence of vector mosquitoes can be tracked yearly in order to plan ahead for control efforts in subsequent years to reduce the risk of vector mosquitoes before they become too numerous.

As of this printing, the CDC CO₂-baited light traps or similar traps were the preferred method for collecting female mosquitoes; females are the only ones that bite. These traps are typically set out one or two separate nights per week for a 12-14 hour period during the calendar months of April through October 1. This time frame may vary depending on the occurrence of killing frosts (when mosquito activity diminishes) in an area. The trap collections are picked up the next day. Mosquitoes are identified and sorted under the microscope to the genus and sometimes to the species level and pooled accordingly. Ideally, the capacity to identify different mosquito species is established locally, in-house. Once mosquito types are identified, the relative amount of vector species can be identified so the level of risk for disease can be better

understood in that area. The presence of a large amount of vector-type mosquitoes should stimulate enhanced control efforts.

- Mosquito landing rates: The “light and bite” or landing rate method, often used by entomologists to determine the density of mosquito populations, is NOT recommended in areas where mosquito-borne virus (e.g., WNV) occurs, including Idaho.

Monitoring for Virus:

If mosquitoes are to be tested for virus, mosquitoes are pooled into vials by similar species and marked with the collection date and location. The resulting sampling scheme should be maintained in a master database at the abatement district. Contact the Idaho Department of Health and Welfare, Bureau of Laboratories regarding testing of certain species of mosquitoes. If the mosquito pools are sent to the public health laboratory for WNV testing, a copy of the results will be returned to the submitting agency for recording and evaluation. This data may help determine what control measures are warranted at the local level (e.g., mosquito abatement, source reduction, etc.). Virus testing not only indicates the presence or absence of virus but also allows the MAD to calculate a “minimum infection rate” (MIR). The MIR is used to determine the relative amount of WNV-positive mosquitoes being trapped and may provide a control threshold, which can vary from location to location.

Human, bird and horse test results: Each positive laboratory test for a human, or a horse will be investigated to determine if that infection was acquired in Idaho. Due to confidentiality issues, press releases may be generated but the identity of the person or horse and exact location will be withheld. Information will be relayed only in terms of county present. Bird data will also be tracked by county. The general public will be alerted through timely press releases. Press releases will encourage individuals to take personal protective measures against mosquitoes and mosquito bites and to assure that horses have been properly vaccinated.

All test results are maintained by the state Office of Epidemiology and Food Protection in the Department of Health and Welfare and copies are furnished to the submitting agency and the corresponding public health district. Summary data is available in a timely manner on the Idaho Department of Health and Welfare web site: www.westnile.idaho.gov.

C. Prevention:

The importance of mosquito control is that it reduces the number of flying adult mosquitoes and thereby reduces the risk of mosquito-borne virus transmission to humans and animals.

Eliminating/modifying mosquito development habitats:

- Mosquito larvae prevention: The elimination or modification of mosquito development habitat, when feasible and within the boundaries of abatement

regulations is a critical component to mosquito control and considered the best long-term solution to a mosquito problem. These activities include; avoiding irrigation over-watering in public and private areas, draining and/or filling-in* of areas of shallow stagnant water, increasing flow rates in irrigation and drainage canals, eliminating water holding containers and reducing and/or eliminating vegetation in slack/stagnant water which support mosquito production. Most of these activities can be achieved through cooperative agreements with other agencies and political subdivisions and by the use of public education campaigns.

** The “filling in” of areas of shallow stagnant water may not be the solution and may actually increase mosquito habitat if the displaced water has nowhere to drain.*

- Abatement of mosquito larvae in their aquatic habitats: Mosquito larvicide applications selectively target mosquito larvae and are effective in reducing mosquito populations. This type of mosquito control measure requires considerable personnel, equipment, materials, planning, mosquito survey work and expense. Biological pesticides, such as *Bacillus thuringiensis israelensis* (Bti) and *Bacillus sphaericus* (Bs) are used as mosquito larvicides and applied to mosquito development habitats when mosquito larvae are found in the 1st to 3rd instar stage of life. Methoprene is another larvicide that is used to control mosquitoes. It acts as an insect growth regulator to prevent larvae from pupating (maturing). Aquatic sites often come under different jurisdictions, which have limitations to insecticide usage. Please refer to the “Special considerations for pesticide application and other control methods” section of this plan prior to the use of any insecticide.

D. Intervention:

Adult mosquito intervention:

This method should be considered when rapid reduction in adult mosquito populations is warranted and when other control methods have not kept the mosquito populations in check.

The ultra low volume (ULV) adulticide spray method is typically used where monitoring, surveillance and verifiable complaints from MAD constituents indicate the presence of adult mosquitoes (See Phased Response Section for reference thresholds). All pesticide applications must be conducted in accordance with the label directions on the product container that are specified by the U.S. Environmental Protection Agency.

One of the current mosquito insecticides (mosquitocide or adulticide) used in ULV treatments by many of the MAD's is a malathion-based ULV concentrate. This product is a low-residual insecticide with excellent efficacy against adult mosquitoes. In Idaho much cropland is present and malathion is used because it generally does not have cropland restrictions on its label directions. Pyrethrin-based products are also

used for adult mosquito control Read and follow label-directions carefully as some have limitations on how and where they can be used.

Pyrethrin-based products may be used in residential areas-avoiding cropland and sensitive aquatic areas according to label restrictions. These products are very low-residual insecticides that last less than a day in the environment. There are several brand names of products with similar active ingredients but with potential variations in label directions, always read the label directions prior to planning or making a pesticide application.

ULV applications for adult mosquitoes are routinely announced publicly at the beginning of the mosquito season. Extraordinary situations may require additional public notifications just prior to ULV application and consideration of bee yards, organic farms and sensitive individuals. Additionally, abatement districts should consider establishing a “Call List” for those residents who wish to be called prior to ULV applications in the areas in which they live.

All ULV applications are restricted to property within the District’s jurisdiction, taking into consideration special situations. All applications must be applied according to the insecticide’s label directions by a licensed, or trained, applicator. All application equipment is to be calibrated as per the insecticide label directions and certified as “calibrated” as prescribed on the label directions (usually prior to the start of yearly operations and when the product is changed or if repairs have been made to the ULV equipment). Calibration can be conducted in-house, by the chemical company representative, mosquito control association or other recognized service provider.

Exceptions to the county-approved plan (Idaho Code § 39-2804(8)) are to be reviewed on a case-by-case basis with priority given to emergency health related issues. The board of trustees and the county commissioners must approve any substantial changes to the plan.

During periods of heightened West Nile virus detection, ULV applications will likely increase to intervene in the disease cycle by reducing the flying adult mosquito population.

Threshold determinations for abatement activities:

The IPM process is meant to insure that the application of insecticides is made only when necessary. The suggested threshold factors to consider for enhanced vector control are shown below. Each of these surveillance factor-driven thresholds can differ in impact and significance according to time of year and geographic region. These are benchmarks only and may be modified as appropriate to the conditions in each specific region of the state. Climate may play a role in the abundance of mosquitoes.

Biological factors that emerge as the season progresses are typically, in the following order: mosquito abundance, infections in non-humans (e.g., dead birds, mosquitoes, horses), and infections in humans.

- Larviciding thresholds should be established based on collected monitoring and surveillance data. Population trends should be tracked over multiple years to document expected trends locally. For a description of larva surveillance, see Sacramento-Yolo County reference below.
- Adulticide thresholds. Results of proper mosquito monitoring using recognized surveillance methods (e.g., CDC CO₂ light traps), indicate that a vector mosquito population threshold has been reached, i.e. 50 or more *Culex* mosquitoes per CDC CO₂ light trap for two or more consecutive nights (see phased response level 3 below). Response levels may vary according to local conditions and continued surveillance and monitoring will more clearly define those local thresholds.
- When public complaints of nuisance mosquitoes and service requests are validated by one or more recognized surveillance method.
- When mosquito-borne disease is present in the area (either in mosquito pools, birds, horses, or humans).
- When the minimum infection rate of vector mosquitoes exceeds a ratio of 5 infected mosquitoes/1000 it suggests that there is an increased risk for human illness.

Please refer to the “Phased Response Guidance for Idaho Counties” in the next section for thresholds related to disease intervention.

Reference and resource materials for threshold levels:

Centers for Disease Control and Prevention

“Epidemic/Epizootic West Nile Virus in the United States: Guidelines for Surveillance, Prevention, and Control” 2003

<http://www.cdc.gov/ncidod/dvbid/westnile/index.htm>

California

2007 California Mosquito-borne virus Surveillance and Response Plan

<http://www.westnile.ca.gov/resources.php>

Sacramento-Yolo County Mosquito Abatement District

<http://www.fightthebite.net/publiceducation/chemical.php>

D. IDAHO WEST NILE VIRUS
PHASED-RESPONSE GUIDANCE FOR COUNTIES
Revised 7/2007*



Principles of Phased Response to Arbovirus Detection

- The primary mission of the phased response guidance is to protect the public health and safety of Idaho's citizens and guests.
- The following arbovirus protection provisions for mosquito abatement are proposed as responses to various indicators of virus or the threat of virus in the environment.
- The levels of response are presented in a phased manner categorized by perceived risk to human health.
- The response guidance is modeled after plans adopted by other states in the continental United States, with revisions to address Idaho's current situation.
- The use of phased response thresholds should always take into consideration local surveillance findings.
- The response guidance is consistent with acceptable national practice standards

*Originally published 3/2003 as section 3.F: "Idaho Model Arbovirus Surveillance and Response Guide" from the "Arbovirus Surveillance and Mosquito Control in Idaho: Guidance for Counties"

DEFINITIONS

ARBOVIRUS:

An Arthropod-Borne virus is considered vector-borne; transmitted by the bite of an infected arthropod such as a mosquito or a tick. Examples include West Nile virus (WNV), St. Louis encephalitis virus (SLE), and western equine encephalomyelitis virus (WEE). Many of the mosquitoes responsible for transmission of these viruses do exist in Idaho.

EPIZOOTIC:

An outbreak of a disease in an animal population.

EPIDEMIC:

An outbreak of a disease in humans.

INTEGRATED PEST MANAGEMENT (IPM):

A tiered approach to decision making and mosquito population control, including mosquito identification, development site location, site reduction or removal, larviciding, adulticiding and public education.

LEVEL #:

The level number represents the recommended response phases based on surveillance findings. *NOTE: level designations are NEW and do not correspond with the original phased response numbers in the 3-14-03 Guidance for Counties document.*

PEST MANAGEMENT PLAN (PMP):

An objective, sustainable plan which includes strategies and tactics, to control mosquitoes in a defined area.

RESPONSE:

Recommended activities for pest control in counties.

STATUS:

Features that clarify level designations in your county.

VECTOR:

A carrier, often an arthropod such as a mosquito or tick, transferring disease from one host to another through a bite or scratch.

Public Health / Mosquito Control Response Levels

- Level 1:** Probability of human infections – remote
- Level 2:** Probability of human infections – low
- Level 3:** Probability of outbreak in humans – moderate to high
- Level 4:** Probability of outbreak in humans – in progress (100%)
- Level 5:** Probability of human infections – in decline

Level 1: Probability of human infections: *Remote*

Status:

- No positive surveillance indicators currently found in the COUNTY, and
- Mosquitoes are starting to emerge in the spring.

Response should include the following:

- Develop initial, or review existing, PEST MANAGEMENT PLAN (PMP), which may include the formation of an interim abatement district, according to Title 39, Chapter 28 -ABATEMENT DISTRICTS.
- Identify County West Nile Virus contact person directly in charge of IPM control efforts. Notify IDHW Office of Epidemiology and Food Protection and the Bureau of Homeland Security of this contact point information for future communication links.
- Assign agency or entity responsible for implementing and providing integrated pest management (IPM) activities in county based on PMP.
- Establish list of contacts in other local agencies (e.g. public health district, local Fish and Game office, Department of Agriculture representative) and resource personnel (e.g. aerial applicators, entomologists, extension agent).
- Identify and keep a record of special groups such as beekeepers/organic growers and pesticide-sensitive individuals, where possible. This will be critical, should aerial spraying occur in your county; these individuals or entities may need to be contacted if aerial or enhanced spraying commences.
- Obtain training for needed personnel for mosquito control.
- Initiate first steps of IPM process: Collect and identify adult mosquitoes, locate and map mosquito development sites and monitor mosquito larval populations to establish a baseline, paying particular attention to the presence or absence of known vector species, such as *Culex tarsalis* and *Culex pipiens* since this information is related to control action thresholds (see Level #3).
 - If resources allow, initiate virus testing of appropriate mosquito pools.
- Analyze findings and develop recommendations which may include the following:
 - Initiating early season mosquito control programs with an emphasis on larval control based on the following IPM hierarchy:
 - Encouraging cultural controls: alterations in irrigation water management, emptying containers with water accumulation;
 - Physical controls: habitat modification to reduce development sites;

- Biological controls: mosquito fish, other;
- Chemical controls; larvicides / adulticides.
- Work with local public health districts to promote “Fight the Bite” educational campaign.
- Contact Idaho Department of Fish and Game Regional office to request information regarding dead bird testing.
- Prepare and coordinate any press releases regarding positive findings (mosquitoes, birds, humans, etc.) with local public health district public information officers.
- Consult with Idaho State Department of Agriculture (ISDA) pesticide program staff regarding appropriate application of pesticides.
- Plan for and develop bid specifications for contract application of adulticides in the event of an arboviral emergency or operational need for enhanced adulticiding.

Level 2: Probability of human infections: *Low*

Status:

- First evidence of virus activity has been detected in your county or neighboring county in non-human surveillance indicators (e.g. mosquitoes, birds, horses).

Response should include the following:

- CONTINUE WITH LEVEL ONE ACTIVITIES, and
- Revise initial PMP if conditions warrant.
- Work with appropriate agencies to communicate with consistent messages regarding positive surveillance findings, notification of affected areas, personal risk reduction practices, and use of mosquito control measures. Appropriate collaborative agencies, based on type of positive findings, include the following: Public Health Districts (for positive findings in humans, mosquitoes); Fish and Game (for positive findings in birds); Idaho State Department of Agriculture (for positive findings in horses).
- Define geographic area(s) for increased monitoring and control where virus transmission appears most active and expand monitoring activities in scope, frequency, and type as necessary. This may include additional mosquito traps, increased trapping frequency and coordinating data-sharing with Public Health Districts, regional Fish and Game offices and ISDA.
- Monitor minimum infection rates (MIR) of *Culex* mosquitoes (Requires RAMP test and laboratory support) if local testing available or,
- In the absence of *RAMP* (WNV) testing capabilities, monitor *Culex* population (the predominant vector species) for increasing numbers.
- Increase larvicide applications and initiate ground ULV (ultra-low-volume) fogging applications (adulticide) in areas where West Nile virus is confirmed in mosquitoes, birds or horses or in areas where *Culex* mosquito populations are escalating.

- Increase larval monitoring and control where applicable (rule of thumb indicates that approximately 75% of operational budget should go to larval control activities).
- Identify additional resources needed to address situation.

Level 3: Probability of outbreak in humans: *Moderate to High*

Status:

- Increase in WNV-positive surveillance indicators in your county, or
- Large or significant increase in *Culex* species mosquito populations, or
- Large or significant increase in the number of infected mosquito pools (i.e. rising minimum infection rates), or
- First human case detected in your county or neighboring county.

Response should include the following:

- CONTINUE WITH LEVELS ONE AND TWO ACTIVITIES,
- Keep current with human surveillance findings in your county and state by frequently contacting your public health district or visiting the surveillance table found on the IDHW web site www.westnile.idaho.gov
- Update PMP, if needed, as monitoring and surveillance data develops,
- Enhanced activities may include applying more frequent larvicide or ground ULV fogging (adulticide) applications in areas where disease is confirmed.
- If the MIR reaches a ratio greater than 5 infected mosquitoes per 1000, by RAMP or other virus detection methods, begin initiating emergency interventions which may include aggressive adulticiding to reduce the threat of disease transmission in that area. Adulticiding options include enhanced ground fogging or aerial applications.
- In the absence of RAMP testing, if mosquito population numbers reach 50 or more *Culex* mosquitoes per CDC CO2 Light trap for two or more consecutive nights, implementation of more aggressive adult mosquito-control tactics may be warranted.
- Begin preparations in county if aerial spraying is considered (e.g. selection of pesticide product after consultation with ISDA pesticide coordinator/or professional consultant, notify contract services of pending situation).
- Notify public and special populations such as affected beekeepers/organic growers, sensitive individuals, of spraying locations and times, if necessary.
- Document extraordinary costs associated with enhanced control.

Level 4: Probability of outbreak in humans: *High/In Progress*

Status:

- Multiple human cases occurring in county and surrounding counties suggesting epidemic level activity.
- Ongoing evidence of WNV in other surveillance indicators (e.g. birds, horses, and mosquitoes).

Response should include the following:

- CONTINUE WITH LEVELS ONE, TWO, AND THREE ACTIVITIES
- Update PMP, if necessary, as monitoring and surveillance data develops
- Discuss whether or not County Disaster Declaration is needed or if other enhanced response is appropriate or sufficient.
- Focus all resources on human case prevention and adult mosquito control (include a larvicide strategy in combination with adulticide application).
- Cease mosquito population surveillance and only conduct mosquito trapping to determine areas for control and to assess effectiveness of adult control activities.
- If aerial spraying is deemed necessary, move forward with pre-spraying preparations (e.g., mosquito trapping prior to aerial spraying to be able to measure the relative effects of adulticide treatment [which would be followed by post-aerial spraying trapping for comparison], contact owners of registered bee hives, organic farms, sensitive individuals, etc. per PREVIOUS LEVELS).
- Begin extensive public education campaign if aerial adulticide program is pending, including criteria for increased control activities, pesticides used, specific times, and locations of planned application.

Level 5: Probability of human infections: *In Decline*

Status:

- Late season, mosquito activity declining.
- Rate of new human and animal case reports declining.

Response should include the following:

- Reduce or discontinue enhanced adult mosquito control activities based on surveillance and climatic data.
- Compile mosquito survey data.
- Gather year-end statewide and county-specific data from state agencies carrying out surveillance activities in order to evaluate the current response.
- Update PMP, if necessary, for following year based on lessons learned.
- Compile after-action report; include actions taken, effectiveness of actions using surveillance data, observations for proceeding year's operational plan and operational costs.
- Notify Idaho State Bureau of Homeland Security and Idaho Department of Health and Welfare of status.
- Provide associated agencies with copies of after action reports, plans and budget sheets as needed.
- If interim abatement districts were formed, review and act on the election and funding requirements for the up-coming year.
- Process emergency funding documentation as required.



E. Budget estimates for start-up operations:

The following estimates are provided for planning purposes only. Some of the items may already exist in one of the other county operations (such as weed control or road department office or shop space) and need not be duplicated.

The following budget list is not meant to be all-inclusive since different areas have different needs or challenges. The list will provide planners with the basic elements for the establishment of a mosquito abatement program. Please do not total the columns since several items have been placed in the list to increase the opportunity that all factors will be considered, i.e. facility mortgage payment and monthly office rent. Pick the items that need to be considered for your operation and expand on that list to cover items particular to your planning area.

<u>Budget Estimates</u>	<u>1st/Annual</u>	<u>Capital Purchase & Replacement</u>
Capitol Equipment	\$107,800	\$ 12,000
Non-Capitol Equip.	\$ 6,600	\$ 3,000
Facilities	\$174,500	\$ 24,000
		(\$2,000 per month)
Materials and Supplies	\$ 10,500	\$ 10,500
Manpower	\$124,400	\$124,400+
Operations	\$ 21,900	\$ 21,900+

Contracted Services, see detail below.

Equipment – Based on District of 22 Square Miles =

Capitol Equipment			
Pickup(s)	3 @ \$16,000	=	\$48,000
ULV Spray Unit	3 @ \$10,000	=	\$30,000
Larvicide Granule Spreader	3-4 each @ \$700	=	\$ 2,800
Computer	2 @ \$2,000	=	\$ 4,000
4-Wheeler	1 @ \$10,000	=	\$10,000
Trailer	1 @ \$3,000	=	\$ 3,000
Scope and Lights	1 @ \$4,000	=	\$ 4,000
Forklift	1 @ \$8,000	=	<u>\$ 8,000</u>
\$12,000-16,000 per year est. replace fund			\$109,800

General Use Equipment

Traps	10 @ \$100	=	\$ 1,000
GPS Units	4-5 @ \$200	=	\$ 1,000
Spill Kit	4 @ \$100	=	\$ 400
Wind speed, temperature and related weather devices.		=	\$ 400
Night operations, warning light, flashlights, signs, misc. hand tools, etc.		=	\$ 800

Office Equipment (Desks, Chairs, FAX, machine, file cabinet, etc)	=	<u>\$ 3,000</u>
		\$ 6,600

Facilities –

Budgets should include secure chemical and equipment storage area(s).

These costs depend on existing local resources and variable land values. Items to be considered in this budget area include, but not limited to the following; *administrative office, mosquito identification room, record storage, surface water (run-on, run-off issues), pesticide storage and security measures. Due to the variable costs, estimates are not given.*

Additional items for consideration:

- Water Supply cross-connection protection
- Land
- Wash Rack/Pad
- Rinsate Recovery System
- Chemical Containment

Materials and Supplies (based on 22 square mile operation - ground application only) per year estimates.

Larvicide	=	\$2,500
Adulticide	=	\$3,100
Office Supplies	=	\$ 600
Vehicle (Gas, Oil)	=	\$2,500
PPE – Gloves, coveralls, aprons, respirators, boots, goggles, etc.	=	<u>\$1,000</u>
		\$9,700

Manpower (Depends on Local Conditions and Factors) ≈ \$130,000 +

Director	=	\$40-50,000 + Benefits (DOE)
Supervisor	=	\$28,000 + Benefits
Office (P/T)	=	\$ 9,400
Seasonal Personnel	=	\$50,000
<i>5 technicians @ 1,000 hours per season</i>		

Operations

Routine Services – Annual Basis

Telephone/Cell Phone Communication	\$ 3,000
Power	\$ 1,200
Internet Service	\$ 300
Education - PSA / Community Outreach / Promotion	\$ 2,500
Training/Licenses	\$ 3,000
Surveillance / Monitoring	\$ 8,400 - \$10,000
Calibration of Sprayers	\$ 200

Container Recycling	\$ n/c
Medical Monitoring/Respirator Fit Test (Dibrom)	\$ 400
Accounting / Audit	\$ 2,000
Legal / Counsel	\$ 3,000
Vehicle and General Liability Insurance	\$ 8,000
Water (drinking and irrigation)	\$ 300
Sewer/ Trash	\$ 600
Drainage Work / Survey Service	
Project Based - 50/50 Split	<u>\$ 10,000</u>

\$42,500

Based on 2002 data from Canyon County annual increases anticipated.

Contracted Services

Drainage Contractor – Project Based	\$10,000 (+ or -)
Ground application	\$70 - 200 per hour
Air application - Adulticide	\$ 1 - 6 per acre
Air application – Larvicide	\$14-20 per acre

Contracted application rates are estimates based on historical values and may not be applicable at current date or in your given situation. \$10,000 was placed into plan to cover drainage activities on an "on-call" basis.)

Costs – Estimate Extensions

- Surveillance/ Monitoring and Mosquito Identification estimate 20 to 30 hours per week and a 20 week operational period = 400 - 600 hours for approximately \$8,000 to \$10,000 per year.
- Larviciding Product - \$5,000 on a 22 square mile district (\approx \$1.50 pounds)
- Adulticide – Product - \$10,000 on a 22 square mile district (110 gal @ \$125 per gallon by ground fogger).
- Licensure – (Driving and Pesticide Applicator) \$ 120
- Training – Example of training that may be required (Mosquito University, PPE, Hazardous Materials, Fork Lift and Mixer-Loader) Estimate training cost is \$3,000

F. Special Considerations for Pesticide Application and Other Control Methods



- **Applicator Licensure:**
All use of restricted use pesticides (RUPs) and commercial application of all types of pesticides for mosquito control must be conducted by a licensed applicator in the public health (PH) category. Employees of formalized mosquito abatement district may apply general use pesticides without licensure to properties managed by the district. Due to the public nature of this program the Idaho State Department of Agriculture recommends that mosquito control personnel be licensed, as a condition of hire, to demonstrate competency of the applicator.
- **Aerial Applications:**
All proposed aerial applications of pesticides must be reviewed by the FAA and performed by a licensed professional applicator.
- **Aquatic Applications:**
Proposed application of pesticides to surface water used for drinking purposes must be accompanied by a short-term activity exemption from the Idaho Department of Environmental Quality. This exemption must be obtained prior to initiating pesticide application. Note – All pesticide applications require that the pesticide label directions must be followed and applicator be in compliance with federal and state laws and regulations. Failure to follow label directions in the application of aquatic pesticides may place the applicator into the enforcement jurisdictions of both the Federal Insecticide Fungicide and Rodenticide Act and the Clean Water Act.
- **Bee Colony locations:**
ISDA requires bee keepers within Idaho to be registered; however, some beekeepers do not bother to register their hives or move them to new locations every year. Check with ISDA for registered beekeepers on a county-by-county basis, prior to spraying. Mosquito adulticides used for mosquito control will kill bees if improperly applied. Follow pesticide label instructions and ISDA rule IDAPA 02.03.03.400 for restrictions related to the protection of pollinators. In general the restrictions on application of pesticides toxic to bees allow for application during the time frame three hours prior to sunset and three hours after sunrise. These time frames are very well suited for the control of adult mosquitoes since they are most active during these periods and into the evening hours.
- **Biologically-controlled areas:**
An example includes the use of organisms to consume noxious weeds, purple loosestrife, and yellow star thistle. Adulticide applications should be avoided in these areas. Check with the local county agriculture extension agent for information specific to your area.
- **Chemically sensitive Individuals:**
Idaho does not have a registry for individuals with chemical sensitivities. In practice, most mosquito abatement districts have retained lists of citizens who wish to be notified prior to any application in their area. Notification allows the person to leave the

immediate area during pesticide application. Individuals may also request no-spray zones. This should be discussed with MAD management. Publicizing spraying activities and contact information prior to pesticide application may provide an opportunity for concerned individuals to identify themselves.

- **Endangered or Threatened Species:**

For information related to Endangered Species Act (ESA) specific issues in your area you may contact the Idaho Conservation Data Center at the Idaho Department of Fish and Game, attn: George Stephans (208) 334-3402

- **Federally managed lands:**

Wildlife refuges- U.S. Fish and Wildlife Service, Department of the Interior , Boise, (208) 378-5243

National forests- US Forest Service/US Department of Agriculture

Rangeland- Bureau of Land Management/US Department of Interior

Dams/recreation- Bureau of Reclamation/US Department of Interior

- **Organic Farms:**

Certified organic farms are registered with the ISDA. Please check with ISDA for organic operations in your area prior to pesticide application. It is important to avoid pesticide application that would result in pesticide residues on organic products.

- **Private Recreation Areas:**

Idaho Power Co. and other Parks and Campsites, private resorts, managed hot springs, water parks

- **Restricted Pesticide Application Areas:**

These areas are established according to ISDA laws and rules. Locations of restricted areas may be obtained by contacting ISDA.

- **State Managed Lands and Hatcheries**

Idaho Department of Parks and Recreation

Idaho Department of Lands

Idaho Department of Fish and Game

Idaho Department of Transportation

- **County/City Parks**

- **Water irrigation districts, canal companies, and drainage districts:**

These operations, if working properly, should not promote mosquito breeding, as water should be moving quickly enough to inhibit mosquito breeding. These operations can evaluate and initiate drainage of breeding sites on property controlled by them.

- **Wetlands:**

All drainage projects should be evaluated in terms of the requirements put forth in the federal wetlands act administered by the U.S. Corp. of Army Engineers.

G. Frequently asked questions from areas lacking abatement districts:



Q. Why should we form an abatement district and what are the advantages?

A. Mosquito abatement districts (MADs), are formed for many reasons. One is to protect the public's health by reducing disease-carrying mosquitoes. Arboviruses (insect borne viruses) may be life threatening to some individuals and cause life-long debilitating disease in others. MADs also provide a community service by eliminating pest mosquitoes which annoy residents, worry livestock (an economic issue), and inhibit recreational opportunities. MAD formation can be an effective method of pooling financial, labor and capital equipment costs.

Q. Can we ask abatement districts to abate mosquitoes in our area even though we don't have an abatement district of our own?

A. MAD's function as described in Statute (Idaho Code § 39-2804) to abate mosquitoes within a described district. Operations outside of the establish district become restricted by insurance coverage, service priorities and jurisdictional issues.

Q. Why does it take so long to establish a formal abatement district?

A. The mosquito abatement act was designed to allow for local residents to vote for, fund, implement and manage the mosquito abatement activities in their immediate area. The election process and the setting of the levy to collect operational funds, as a tax assessment, take the most time. The whole process averages two years to complete (certain deadlines for developing budgets and setting the levy must be followed to prevent extensions of an additional year).

Q. Why aren't abatement districts countywide?

A. Ideally abatement districts should be countywide and some are moving in that direction. Abatement districts already in existence are finding it difficult to annex adjacent or non-adjacent regions in their counties when the need arises. In fact, the process of annexation may be as difficult as establishing a new abatement district. Abatement districts may include property in two or more counties and operate under one management plan as long as the district area is contiguous or is non-contiguous by means of publicly held property separating the involved parcels.

Q. Who should make abatement decisions?

A. Abatement districts are headed by county commissioner-appointed trustees who prioritize abatement efforts (Idaho Code § 39-2803). A MAD may employ a director to make the day-to-day management / operational decisions. These decisions are based on approved an annual work plan and budget. Legislation in 2007 allows county commissioners to take the active roll of the board of trustees. That same legislation allows county commissioners to form county-wide interim

abatement districts for up to two years. At the general election within those two years the county must put the abatement district formation on the ballot to fully authorize (or disband) the operation.

Private property owners and public property managers may abate pest populations on the property they control. Note – All use of pesticides must be in accordance with the label directions and in compliance with the laws and rules of Idaho.

Q. How can we get some start-up funds to begin abatement activities prior to the influx of revenue through taxation?

A. Tax anticipation loans may be obtained from lending institutions for districts that have formed but are not receiving revenues yet. Donations may also be utilized but operational plans and budgets need to be submitted to county commissioners for approval prior to implementation of control measures. Legislation may clear the way for other methods of funding such as a grant program but at this time no other options have been authorized.

Q. Can the Public Health Districts help with mosquito abatement?

A. The Health Districts are not licensed pesticide applicators. The Health Districts are ex-official members of the board of trustees for each existing MAD and therefore are active in the administration of the MAD by offering guidance related to public health. Several of the Health Districts have personnel that have vector control experience and or knowledge and may be of assistance but as of this time there are no formal vector control specialists available either at the local or state agency level.

Q. What should we do if surveillance efforts in our area detect WNV (positive mosquito pools, positive dead birds, positive horses or positive people) and we are not in an abatement district?

A. Education is the strongest option with limited funding and operational capabilities. The public health district is a strong ally with the ability to provide media statements and education for the public regarding mosquito bite avoidance personal protective measures. Additional information can be obtained by visiting the web site: <http://westnile.idaho.gov/>
This site also provides links to other agencies such as the Idaho State Department of Agriculture with information related to protective measures for horses and registered mosquito control products (pesticides).

Q. Can existing abatement districts or counties make requests directly to FEMA for assistance if they are unable to financially maintain adequate abatement when arboviruses are detected?

A. Once a state disaster declaration has been made at the request of the county, that county may submit a plan of operations seeking funds to control vector populations. The Idaho Bureau of Homeland Security will be the administrative agency for all state declared disaster operations.



Section 4

Appendices

- A.** Glossary of terms related to mosquito control and public health
- B.** Pesticide application rules
- C.** Pesticides for larviciding
- D.** Pesticides for adulticiding
- E.** Special training required prior to pesticide application
- F.** Agency duties and contact lists

Appendix A

Glossary of Terms Related to Mosquito Control and Public Health

adulticide	a type of pesticide used to kill adult mosquitoes
arthropod	a group of animals that do not have a backbone such as insects, spiders, and crustaceans
assay	a laboratory test
avian surveillance	monitoring of the bird population for presence of a disease
<i>Bacillus sphaericus</i>	a bacterium; type of biological pesticide used to eradicate mosquito larvae in water (mosquito larvae die after ingesting this bacteria)
<i>Bacillus thuringiensis</i> var. <i>israelensis</i> (BTI)	a bacterium; type of biological pesticide used to eradicate mosquito larvae in water (mosquito larvae die after ingesting this bacteria)
catch basins	grates seen at street corners for water runoff
communicable diseases	illnesses due to specific infectious agents or their toxic products that can be transmitted from an infected person or animal to a susceptible host; either directly or indirectly through an intermediate host
<i>Culex pipiens</i>	species of mosquito, the primary known vector for West Nile virus, commonly found in urban areas; breeds in fresh but stagnant water such as backyard containers and storm drains
DEET	DEET (chemical name, N,N-diethyl-meta-toluamide) is the active ingredient in many insect repellent products
encephalitis	inflammation of the brain.
etiologic agents	biologic organism or chemical material that cause disease
gravid traps	type of mosquito traps designed to attract pregnant female mosquitoes
IgM-capture enzyme immunoassay (EIA) testing	a laboratory analysis for the presence of Immunoglobulin M antibodies (antibodies that rise during the acute phase of an illness and are a sign of recent infection)
indirect IgG enzyme immunoassay (EIA) testing	a laboratory analysis for the presence of Immunoglobulin G antibodies (long-lasting antibodies; their presence are a sign of past infection)
larvae	immature mosquitoes; stage which hatches from the egg, prior to adult stage
larvicide	a type of pesticide used to eradicate immature mosquitoes (larvae)
meningitis	inflammation of the lining of the brain and spinal cord which can be caused by a virus or a bacteria

methoprene	a type of larvicide; chemical that is used to prevent mosquito larvae from emerging and developing into adult mosquitoes
migratory birds	birds that fly south for the winter and return north in the spring
mosquito breeding site	where mosquitoes lay eggs, typically stagnant water with organic material.
mosquito pool	a group of mosquitoes collected in one area and combined for laboratory testing.
N,N-diethyl-metatoluamide	DEET (chemical name, N,N-diethyl-meta-toluamide) is the active ingredient in many insect repellent products
necropsy	autopsy on an animal
outbreak	an unexpected increase in frequency or distribution of a disease
overwintering	a period of rest or hibernation by which insects survive the winter
pesticide	substance used to kill pests such as insects, mice and rats; insecticide is a form of pesticide
pyrethroid	a synthetic organic compound with insecticidal properties similar to pyrethrins
resmethrin	a synthetic pyrethroid pesticide used to eradicate adult mosquitoes in the home, lawn, garden and at industrial sites; active ingredient in the product Scourge
serologic	of, or relating to serum
serum	liquid portion of the blood containing proteins, including antibodies
vector	an organism (an insect in most cases) capable of carrying and transmitting a disease-causing agent from one host to another
vector control	mechanism instituted to control and reduce the vector population
vector surveillance	monitoring of the vector population for presence of a disease
viral	of or relating to a virus
viral encephalitis	inflammation of the brain caused by a virus

Appendix B

Pesticide Application Rules

ISDA - Idaho Pesticides and Chemigation Law

Idaho Code Chapter 34, Title 22

Rules Governing Pesticide and Chemigation Use and Application

IDAPA 02.03.03

USEPA – Federal Insecticide Fungicide and Rodenticide Act (FIFRA)

State Lead Agency – Idaho State Department of Agriculture

– Clean Water Act

State Lead Agency – DEQ

DEQ - Aquatic Pesticide Application Rules IDAPA 58.01.02.080 (see below)

DEQ Water Quality Standards and Application of Aquatic Pesticides

The Idaho State Department of Agriculture (ISDA) regulates the application of pesticides within the state. In the State of Idaho, individuals wishing to discharge a pollutant from a point source into waters of the United States are required to obtain an NPDES permit from the EPA prior to discharge. The Idaho Department of Environmental Quality (DEQ) does not have regulatory authority for the NPDES program.

EPA recently published a final rule exempting certain pesticide application activities, consistent with all relevant requirements of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), from NPDES permitting. This exemption includes the application of pesticides directly to waters of the United States in order to control pests, including aquatic weeds and the application of pesticides to control pests that are present over waters of the United States. (See Application of Pesticides to Waters of the United States in Compliance with FIFRA, 71 Fed. Reg. 68483 (Nov. 27, 2006) to be codified at 40 CFR Part 122.3)

The Idaho Department of Environmental Quality has adopted water quality standards (WQS) that govern the surface waters in Idaho (See IDAPA 58.01.02). The DEQ through this rule regulates the discharge of pollutants to waters of the state. The WQS prohibit the discharge of pollutants in a manner that:

- (1) will result in the exceedance of a WQS;
- (2) will injure designated or existing beneficial uses; or
- (3) is not authorized by the appropriate agency for those discharges.

With the adoption by EPA of a rule exempting applicants of FIFRA registered aquatic pesticides from having to obtain an NPDES permit, DEQ has also determined that applications of FIFRA registered aquatic pesticides do not need to be authorized under the short term activity exemption of the WQS (See IDAPA 58.01.02.080.02).

The DEQ does not require the issuance of a short term activity exemption for application of FIFRA registered aquatic pesticides. Only non FIFRA registered pesticides if used in a manner that would result in a discharge to surface waters would be required to obtain a short term activity exemption from DEQ.

080. VIOLATION OF WATER QUALITY STANDARDS.

01. Discharges Which Result in Water Quality Standards Violation. No pollutant shall be discharged from a single source or in combination with pollutants discharged from other sources in concentrations or in a manner that: (7-1-93)

- a. Will or can be expected to result in violation of the water quality standards applicable to the receiving water body or downstream waters; or (7-1-93)
- b. Will injure designated or existing beneficial uses; or (8-24-94)
- c. Is not authorized by the appropriate authorizing agency for those discharges that require authorization. (8-24-94)

02. Short Term Activity Exemption. The Department or the Board can authorize, with whatever conditions deemed necessary, short term activities even though such activities can result in a violation of these rules; (8-24-94)

- a. No activity can be authorized by the provisions of Subsection 080.02 unless: (7-1-93)
 - i. The activity is essential to the protection or promotion of public interest; (7-1-93)
 - ii. No permanent or long term injury of beneficial uses is likely as a result of the activity. (7-1-93)
- b. Activities eligible for authorization by Subsection 080.02 include, but are not limited to: (7-1-93)
 - i. Wastewater treatment facility maintenance; (7-1-93)
 - ii. Fish eradication projects; (7-1-93)
 - iii. Mosquito abatement projects; (7-1-93)
 - iv. Algae and weed control projects; (7-1-93)
 - v. Dredge and fill activities; (3-20-97)
 - vi. Maintenance of existing structures; (3-20-97)
 - vii. Limited road and trail reconstruction; (3-20-97)
 - viii. Soil stabilization measures; (3-20-97)
 - ix. Habitat enhancement structures; and (3-20-97)
 - x. Activities which result in overall enhancement or maintenance of beneficial uses. (7-1-93)

03. Temperature Exemption. Exceeding the temperature criteria in Section 250 will not be considered a water quality standard violation when the air temperature of a given day exceeds the ninetieth percentile of a yearly series of the maximum weekly maximum air temperature (MWMT) calculated over the historic record measured at the nearest weather reporting station. (3-15-02)

IDAPA 58.01.02.080

Appendix C

Larviciding pesticides

Due to the nature of pesticide development and the annual registration of pesticides for distribution within Idaho the following list of mosquito control products may or may not be current. When purchasing pesticide products, inquire if they are registered for sale in Idaho. You may also contact the Idaho State Department of Agriculture at 208-332-8610 to check the registration status of a pesticide.

Larvicides:

1. ***Bacillus thuringiensis israelensis (BTI)***: e.g. Vectobac, Teknar, Mosquito Dunks, Bti Tossits)
Use: Approved for most permanent and temporary bodies of water.
Limitations: Only works on actively feeding stages (larval instar stages one, two and three). BTI does not persist well in the water column.
2. ***Bacillus sphaericus*** (e.g. Vectolex)
Use: Approved for most permanent and temporary bodies of water.
Limitations: Only works on actively feeding stages. *B. sphaericus* does not work well on all species. May persist and have residual activity in some sites.
3. **IGRs (Insect Growth Regulators)**
 - a. Methoprene (e.g. Altosid)
Use: Approved for most permanent and temporary bodies of water.
Limitations: Works best on older instars. Some populations of mosquitoes may show some resistance.
 - b. Diflurobenzamide (e.g. Dimilin)
Use: Impounded tailwater, sewage effluent, urban drains and catch basins.
Limitations: Cannot be applied to wetlands, crops, or near estuaries.
4. **Larviciding oils** (e.g. Golden Bear 1111, BVA Chrysalin)
Use: Ditches, dairy lagoons, floodwater. Effective against all stages, including pupae.
Limitations: Use of these products should be limited to areas that will not have run off or over flow out of treated area. Some plant damage has been observed from the use of larvicidal oils (rice crops in California).
5. **Monomolecular Films** (e.g. Agnique MMF)
Use: Most standing water including certain crops.
Limitations: Does not work well in areas with winds in excess of ten mph.
6. **Organo-phosphate based larvicides** (e.g. Abate)
Use: Breeding/development sites as specified on label directions.
Limitations: Must be applied to areas with not run off or outflow, not selective, will kill other species besides mosquito larva.

7. **Pyrethrins** (e.g. Pyrenone Tossits)

Use: Breeding sites as specified on label, usually paired with piperonyl butoxide as a synergist.

Limitations: Must be applied to areas with not run off or outflow, not selective, will kill other species besides mosquito larva.

**Always read the label for safety considerations
and follow the directions for use.**

Appendix D

Adulticiding pesticides

Due to the nature of pesticide development and the annual registration of pesticides for distribution within Idaho the following list of mosquito control products may or may not be current. When purchasing pesticide products, inquire if they are registered for sale in Idaho. You may also contact the Idaho State Department of Agriculture at 208-332-8610 to check the registration status of a pesticide.

Adulticides:

1. Organophosphate compounds

Note: Some mosquito populations may become resistant to label OP application rates if applications have been routine over several years. Recommend alternating or cycling adulticide products to avoid resistance development.

a. Malathion (e.g. Fyfanon)

Use: May be applied by air or ground equipment over urban areas, and most crops, and wetlands when applied at labeled rates for public health applications.

Limitations: May damage automobile paint if large droplets are produced; toxic to fish, wildlife and bees; crop residue limitations may result in pre-harvest interval for some crops.

b. Naled (e.g. Dibrom, Trumpet EC)

Use: Air or ground application on fodder crops, swamps, floodwater, residential areas.

Limitations: Same as malathion, and some cosmetic spotting of fruit may occur in dry hot climates. Breakdown product is more toxic and persistent than parent compound.

2. Pyrethrins (natural pyrethrin products: e.g. Pyrenone Mosquito Spray, Pyroicide)

Use: Wetlands, floodwater, residential areas, some crops.

Limitations: Do not apply to drinking water, milking areas; may be toxic to bees, fish, and some wildlife. Shellfish, such as crawdads, display little or no tolerance to these products. Some formulations with synergists have greater limitations.

3. Pyrethroids (synthetic pyrethrin products containing resmethrin, sumethrin, or permethrin: e.g. Scourge, Anvil)

Use: All non-crop areas including wetlands and floodwater.

Limitations: May be toxic to bees, fish, and some wildlife; avoid treating food crops, drinking water or milk production.

Always read the label for safety considerations and directions for use.

Appendix E

Special training required prior to pesticide application:

Depending on type of business and type of pesticide applied two categories of pesticide applicator license are required.

To commercially apply pesticides for mosquito control or to apply a restricted pesticide such as Naled for adult mosquito control one must be licensed in the public health and law and safety categories of the Idaho State Department of Agriculture pesticide applicator licensing program.

Currently there is no requirement for applicator licensing if the applications are of general use pesticides on land owned or controlled by the applicator or the applicator's employer.

A public applicator license category is currently being considered by the ISDA to require licensure of all individuals that apply any pesticide to public property (schools, parks, public buildings), or private property (stores, restaurants, private institutions), open to public access.

Public Health Pesticide Applicator Certification Training-:

Idaho State Department of Agriculture, Sherman Takatori (208) 332-8609

Certification and licensing is required for individuals wishing to apply restricted-use pesticides or apply pesticides commercially in the control of public health vectors.

This training is three hours in length.

General use pesticide application:

Information is available through the Idaho State Department of Agriculture Urban Pesticide Program (Robert Hays, (208) 442-2803) related to the use of general-use pesticides for mosquito control in situations not requiring pesticide applicator licensure.

For more general information on pesticides:

American Mosquito Control Association: <http://www.mosquito.org/>

Northwest mosquito and vector control association: <http://www.nwmvca.org/>

Appendix F

Agency Duties and Contact List

Public Health:

Idaho State Department of Health and Welfare

Office of Epidemiology and Food Protection

450 W. State St., 4th Floor
Boise, ID 83720
(208) 334-5939

The Office of Epidemiology and Food Protection, among other duties, is responsible for tracking reportable diseases in Idaho. West Nile virus is reportable. A reported or suspected case of infection will be investigated to determine, when possible, the source of infection, to confirm laboratory findings, and to promote public health practices designed to reduce human illness.

Bureau of Laboratories

Virology Section
2220 Old Penitentiary Rd.
Boise, ID 83712
(208) 334-2235 x228

The Idaho Department of Health and Welfare, Bureau of Laboratories is capable of testing for the presence of WNV or antibodies against the virus in humans, horses, birds, and mosquitoes. Testing for this virus is a priority with rapid turn-around times and rapid reporting back to the submitting agency or physician.

Bureau of Community and Environmental Health

450 W. State St., 6th Floor
Boise, ID 83720
(208) 208-334-59

The state public health toxicologist provides consultation on pesticide safety issues.

Idaho Health Districts

1. Panhandle Health District

Director: Jeanne Bock
8500 N. Atlas Road
Hayden, ID 83835
(208) 415-5100
FAX: (208) 415-5101
WIC: (208) 415-5130
Home Health: (208) 415-5160
Environmental: (208) 415-5200
Idaho Child Care Program: (208) 415-5130
<http://www.phd1.idaho.gov>

2. North Central Health District

Director: Carol M. Moehrle
215 10th Street
Lewiston, ID 83501
(208) 799-3100
FAX: (208) 799-0349
<http://www2.state.id.us/phd2/>

3. Southwest District Health Department

Director: Eugene Gunderson
920 Main Street
Caldwell, ID 83605
(208) 455-5300
FAX: (208) 454-7722
<http://www.publichealthidaho.com/>

4. Central District Health Department

Director: Russell A. Duke
707 North Armstrong Place
Boise, ID 83704-0825
(208) 375-5211
FAX: (208) 327-8500
<http://www.cdhd.idaho.gov>

5. South Central Public Health Department

Director: Rene LeBlanc
1020 Washington Street North
Twin Falls, ID 83301-3156
(208) 734-5900
FAX: (208) 734-9502
<http://www.phd5.idaho.gov>

6. Southeastern District Health Department

Director: Ed Marugg
1901 Alvin Ricken Drive
Pocatello, ID 83201
(208) 233-9080
FAX: (208) 234-7169
www.sdhdidaho.org

7. Eastern Idaho Public Health District

Director: Richard O. Horne
1250 Hollipark Drive
Idaho Falls, ID 83401
(208) 522-0310
FAX: (208) 525-7063
<http://www.idaho.gov/phd7>

Agriculture:

Idaho State Department of Agriculture (ISDA)

The roles of the Idaho State Department of Agriculture as related to animal disease tracking, the control of mosquitoes, pesticide use and notification contact points include:

1. ISDA, Division of Animal Industries:

ISDA will continue to promote the use of available equine WNV vaccines to protect horses, additionally ISDA will track reported WNV positive horses and advise veterinarians statewide on the actions needed to address the WNV situation in Idaho. The Division of Animal Industries' contact number is (208) 332-8560

2. ISDA's Urban Pesticide Program, Division of Agricultural Resources:

Robert S. Hays, Coordinator; (208) 442-2803

This division and program oversees the following activities:

- the licensure of pesticide applicators,
- the registration of pesticide products used in Idaho,
- routine inspections related to pesticide use, and
- the investigation of pesticide-related complaints.

Idaho State Department of Agriculture Urban Pesticide Program provides, upon request and availability training in:

- Integrated pest management,
- mosquito abatement and vector control,
- pest monitoring/surveillance,
- pest management plan development,
- technical pesticide issues and,
- pesticide regulation compliance.

ULV spray equipment calibration: Calibration should be requested from chemical supplier at time of pesticide purchase. Also calibration may be available through the Idaho Mosquito and Vector Control Association (208)-461-8633. This association-based service is based on request only and an equipment deposit is required. ULV sprayer calibration service was formerly provided by ISDA but is not longer available from this agency.

3. ISDA's Organic Program:

ISDA certifies organic producers. According to IDAPA 02.06.33.004, Section 205.202 Land Requirements:

Any field or farm parcel from which harvested crops are intended to be sold, labeled, or represented as "organic," must: (b) Have no prohibited substances, as listed in 205.105 (i.e. synthetic substances, unless on allowed list, pesticides, fertilizers, prohibited non-synthetic substances, sewage sludge) applied to it for a period of 3 years immediately preceding harvest of the crop.

A current list of certified organic growers for a given area may be obtained by contacting the ISDA at (208) 332-8673.

4. ISDA Apiary Program: (Bees)

The Idaho State Department of Agriculture's Apiary program registers bee keepers operating in Idaho on a county-by-county basis.

Call (208) 332-8620 for bee keeper contact information.

U.S. Department of Agriculture, APHIS

<http://www.aphis.usda.gov/vs/nahss/equine/wnv/>

1. Veterinary Services
9158 Black Eagle Dr.
Boise, ID
(208) 378-5631
2. Wildlife Services
9158 Black Eagle Dr.
Boise, ID
(208) 378-5077

Wildlife:

Idaho Department of Fish and Game WNV home page:

http://fishandgame.idaho.gov/cms/wildlife/manage_issues/wnv/

Endangered species office:

Idaho Conservation Data Center
(208) 334-3402

Wildlife Diseases Laboratory

16569 S. 10th Ave
Caldwell IE 83605
(208) 454-7646

Idaho Department of Fish and Game Regional Offices:

Panhandle Region

2885 W. Kathleen Ave.
Coeur d'Alene, ID 83815
Phone: (208) 769-1414
Fax: (208) 769-1418

Magic Valley Region

319 South 417 East
Jerome, ID 83338
Phone: (208) 324-4359
Fax: (208) 324-1160

Clearwater Region

3316 16th St.
Lewiston, ID 83501
Phone: (208) 799-5010
Fax: (208) 799-5012

Southwest Region

3101 S. Powerline Rd.
Nampa, ID 83686 (services Boise)
Phone: (208) 465-8465
Fax: (208) 465-8467

McCall Subregion

555 Deinhard Lane
McCall, ID 83638
Phone: (208) 634-8137
Fax: (208) 634-4320

Southeast Region

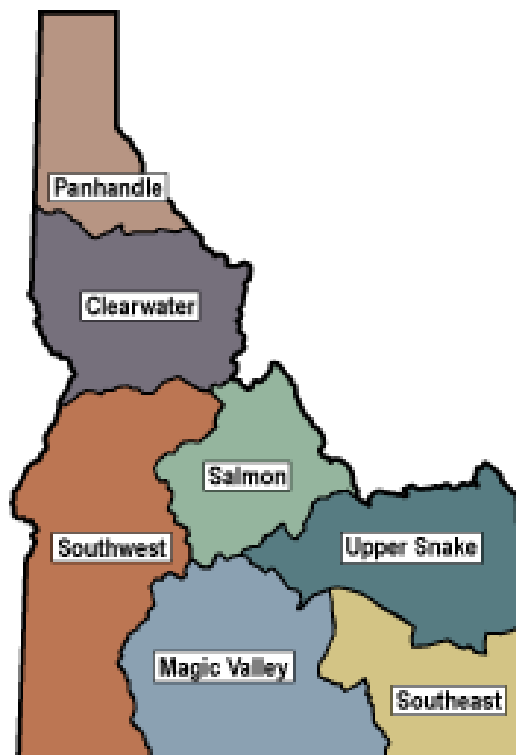
1345 Barton Road
Pocatello, ID 83204
Phone: (208) 232-4703
Fax: (208) 233-6430

Upper Snake Region

4279 Commerce Circle
Idaho Falls, ID 83401
Phone: (208) 525-7290
Fax: (208) 523-7604

Salmon Region

99 Hwy. 93 N.
Mailing Address: PO Box 1336
Salmon, ID 83467
Phone: (208) 756-2271
Fax: (208) 756-6274



Other state agencies:

Idaho Department of Environmental Quality
<http://www.deq.idaho.gov>

Idaho Department of Water Resources
<http://www.idwr.idaho.gov>

Idaho Water Users Association
<http://www.iwua.org/>

Other federal agencies:

Bureau of Land Management

Jan Peterson, Safety/Occupational Health Manager
Idaho State Office 1387 S. Vinnell Way
Boise, Idaho 83709
(208) 373-4030
(208) 373-3805 FAX

National Park Service:

Jerry McCrea
Regional Pest Management Coordinator
National Park Service, Intermountain Region
PH: (505) 988-6024, FAX: (505) 988-6876

Erv Gasser
Regional Pest Management Coordinator
National Park Service, Pacific Region
909 First Ave
Seattle, WA 98104
PH: (206) 220-4263

U.S. Forest Service -

Rob Cruz: (801) 625-5820 (message line) or Paul Ries: (801) 625-5253

U.S. Fish and Wildlife Service:

Kevin Kilbride, Region 1 integrated Pest Management Coordinator
9317 Highway 99, Suite D
Vancouver, WA 98665
Ph: (360) 604-2558; FAX: (360) 604-2505

US Army Corps of Engineers:

Dworshak Dam and Reservoir: Russ Davis, Wildlife Biologist, (208) 476-1203
Lucky Peak Recreation Areas: Joyce Dunning, (208) 343-0671
Lower Granite Lake: Joe Maxwell, Manager, (509) 751-0240

Idaho Mosquito Abatement District Contact List, by County

List subject to change. For the most recent list visit www.westnile.idaho.gov

Ada County MAD
Jack Bennett – Field Operations Manager
975 E. Pine St.
Meridian ID 83642
208-577-4646, 208-577-4643 or
208-869-7482

Bannock County MAD
David Herter
5500 S. 5th St
Pocatello, ID 83204
208-233-9591 or 208-251-3083

Bear Lake County
Bear River MAD
Ron Peterson, Manager
327 Jefferson Street
Montpelier, Idaho 83254
208-847-0545

Bingham County MAD
Craig Rowland, Director, Parks and Emergency
Management
501 North Maple Street
Blackfoot, Idaho 83221
208-782-3190
Fax:208-782-3193

Bonneville County Interim MAD
Commissioner Dave Radford
605 N. Capital Ave
Idaho Falls, ID 83402
208-529-1350

Boundary County
Phil Allegretti
HCR1, Box 309
Naples, ID 83847
208-290-7747

Camas County
Fairfield MAD
Cathy Miller, Manager
P.O. Box 1
Fairfield, Idaho 83327
208-764-3202

Canyon County:

1. Canyon County MAD

Ed Burnett - Director
9719 Highway 45
Nampa, Idaho, 83686
208-461-8633 or 208-871-1860
FAX: 208-461-4459

2. Canyon County Interim MAD
Commissioner Matt Bybee
1115 Albany St.
Caldwell, ID 83605
208-454-7300

Caribou County-Interim MAD
Contact: Veda Mascarenas
P.O. Box 775
Soda Springs, ID 83276
208-547-4324

Custer County:

1. Custer County MAD
Scott Johnson, Secretary - Treasurer
Star Route
Mackay, Idaho 83251
208-588-3072

2. Custer County
Mackay Mosquito District
Sandra Marinac, Secretary
P.O. Box 252
Mackay, Idaho 83251
208-588-3397

Elmore County-Interim MAD:
Marsa Grimmett
150 S. 4th E. Suite 3
Mtn Home, ID 83647
208-587-2130 x 202

Franklin County MAD
Jim Hull
561 W. Oneida
Preston, Idaho 83263
208-852-0653 or 208-852-1050
Fax: 208-852-2812

Fremont County MAD
Scott Butigan, Supt. of Public Works
420 North Bridge
St. Anthony, Idaho 83445
208-624-3494
Fax: 208-624-4003

Gem County MAD
Jason Kinley, Manager
6846 W. Hwy 52
Emmett, Idaho 83617
208-365-5628, 440-2910
Trudi Jackson, Chairman
208-334-4524 or 208-398-8231

Jefferson County:

1. Jefferson County MAD (not countywide)
Justin Miller, Manager
Aaron Johnson, surveillance coordinator
281 North 4570 East
Rigby, Idaho 83442
208-709-7277 or 208-538-7396

2. Roberts MAD
Roger Jackson
P.O. Box 28
Roberts, Idaho 83444
Lenora Lang, Primary Field Operator
208-228-3814 or 208-228-6851

3. Jefferson County- Interim MAD
Christine Boulter, Jefferson County Clerk
210 Courthouse Way, Suite 100
Rigby, ID 83442
208-745-7756

Madison County MAD
Wendell Roth, Ken Phillips
Madison County Solid Waste Department
530 Airport Road
Rexburg, Idaho 83440-5007
208-356-3102 or 208-390-3102

Payette County
Mark Shigeta, Commissioner
1130 3rd Ave. N. Room 104
Payette, Idaho 83661
208-642-6000 or 208-739-1612

Power County-Interim MAD:
contact Ken Estep
P.O. Box 49
Arbon, ID 83212
208-241-4142 or 208-226-7610

Twin Falls-Interim MAD
Terry Kramer, Kali VanLeeuwen
450 6th Ave West
Twin Falls, ID 83301
208-734-9000 or 736-4068

Valley County Interim MAD
Kevin Gaither, Manager
520 S. Front St.
Cascade, ID 83611
208-315-0000, 208-271-6247
or 208-382-7199

Washington County:

Mike Spreadbury Midvale and Cambridge
PO Box 12
Midvale, Idaho 83645
208-355-9255

Idaho Mosquito and Vector Control Association
c/o Ed Burnett, Secretary
Canyon County Mosquito Abatement District
9719 Highway 45
Nampa, Idaho, 83686
208-461-8633 or 208-871-1860
FAX: 208-461-4459